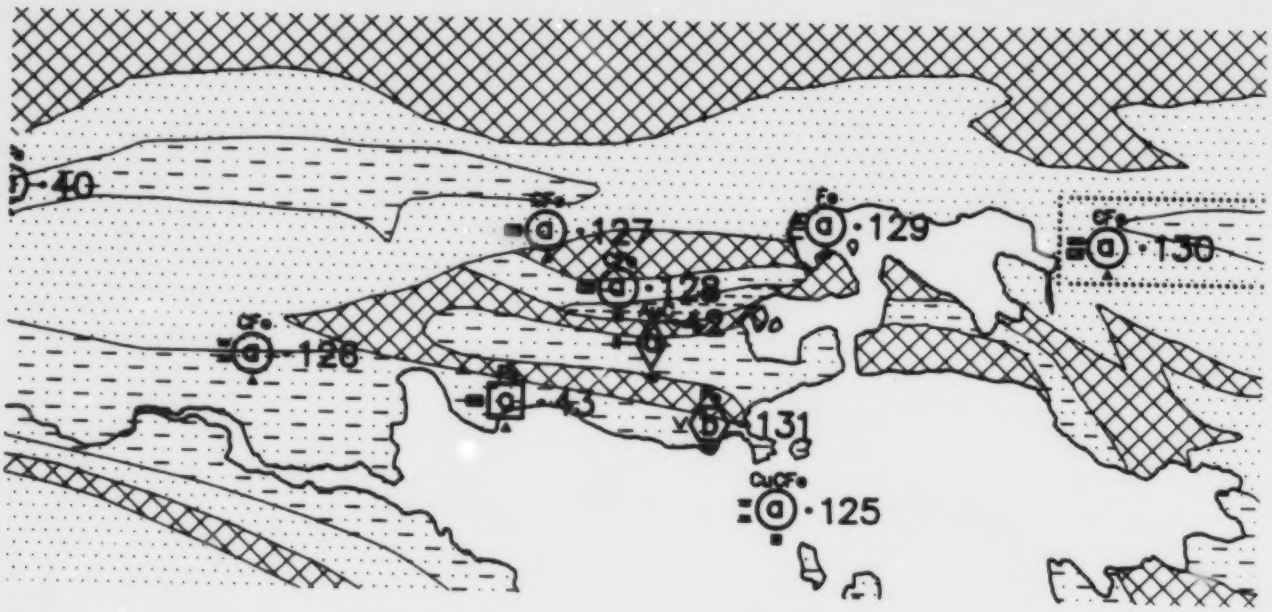
Mineral Deposit Series

Report No. 5




# Mineral Deposits and Occurrences in the File Lake Area, NTS 63K/16

by M.A.F. Fedikow, G. Ostry, K.J. Ferreira and A.G. Galley

**Manitoba**
**Energy and Mines**
Geological Services

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# INTRODUCTION

This report and accompanying map are part of a Mineral Deposit Series presenting a uniformly organized and up-to-date collation and analysis of information on mineral occurrences in the Province of Manitoba. The series is intended: (1) to provide explorationists with a geoscientific data base that can be used in mineral exploration; and (2) to provide a technical data base for other government users in resource evaluations, formulation of mineral and land use policies and the initiation of regional development programs.

## METHODOLOGY

The documentation program was initiated in the main mining districts of the province under the 1984-1989 Canada-Manitoba Mineral Development Agreement. Under this project mineral deposit geologists of the Geological Services Branch have attempted to inspect and evaluate each known mineral occurrence. These site visits ranged from a preliminary half day or less search of an area for old workings, to extensive geological mapping of selected occurrences for a week or more. In addition, for each occurrence the geologists have attempted to synthesize available data from published and unpublished sources. The Manitoba Mineral Inventory Card Index and the cancelled Assessment Files have been used extensively in the preparation of the report. Mineral occurrence documentations representing only cancelled assessment file compilations are identified as such under the heading 'Name'. Information for all other occurrences was acquired primarily by field examination and are commonly supplemented by cancelled assessment file compilations.

Information has been collated and maps prepared with the assistance of junior staff geologists and summer assistants. Senior mineral deposit geologists have provided the deposit classifications and text for the report. The responsibility for the acquisition of mineral deposit information to produce this report was apportioned to the authors in 1984. Accordingly, specific deposit descriptions are attributed as follows:

1) Mark Fedikow (and senior assistants): locations 1 to 35 (including portions of locations 3, 13, 32); field examinations.

2) Gary Ostry: locations 36 to 58; field examinations.

3) Karen Ferreira: locations 23, 25, 33-35, 59 to 106; compilation.

4) Al Galley: locations 3, 13 (No. 1 Vein, No. 2 Vein, Sherry Zone, Blood Zone, East Zone), 14, 32; field examinations.

The locations of all mineral deposits and occurrences are presented in Figure 1.

### Deposit versus Occurrence

Throughout this report mineralization is referred to as a deposit if tonnage and grade figures are known; all other mineralization is referred to as an occurrence.

### Massive Sulphide versus Solid Sulphide

The use of 'massive sulphide' in the geological literature is confusing in that it is not always clear whether the authors are referring to a 'massive sulphide deposit' (cf. Sangster, 1972) or a section of sulphide-rich rock. In this publication 'massive sulphide' will be used in reference to a deposit type, i.e., a volcanogenic massive sulphide deposit type, rather than the nature of the mineralization. A volcanogenic or sedimentogenic massive sulphide deposit can contain a sulphide lens that locally contains as little as 10% sulphide minerals by volume. The alteration zones that are an integral part of many massive sulphide deposits rarely contain more than 50% sulphide minerals. Consequently, the use of 'solid sulphide' for 75%-100% and 'near solid sulphide' for 50%-75% sulphide minerals is adopted in place of the commonly used term 'massive' to describe the textural aspects of a sulphide mineralization.

## FORMAT OF MINERAL DEPOSIT MAPS

### Location:

One of the incentives spurring the mineral deposit documentation was the absence of accurate location maps for known mineral occurrences. Inaccurate land bases have previously resulted in failure to find old workings, surveys conducted in wrong areas, and even cancellation of intended surveys by explorationists. Consequently, considerable field time has been spent in establishing occurrence locations and attempts have been made to display exact locations both on the map and in the accompanying report.

The location number of the map is a unique reference number that will be used both in the report and the geologists' unpublished data base. These numbers are consecutive within each 1:50 000 NTS map sheet (but not within portions of a map sheet such as Map MDS87-1).

### Deposit Types:

In order to maintain a mineral deposit classification, which will be useful to both explorationists and metallogeneticists, a simplified descriptive classification was selected. This classification is based on the use of common deposit types for the classification of both deposits and occurrences. The classification of mineralization is based on the premise that the mineral explorationist requires information on metals and types of mineralization in an area as well as on the economic deposits (past, present and future producers).

All deposits and occurrences are classified according to the Deposit Type classification in Table 1.

The deposit type displayed on the map represents mineralization with the greatest economic potential, for

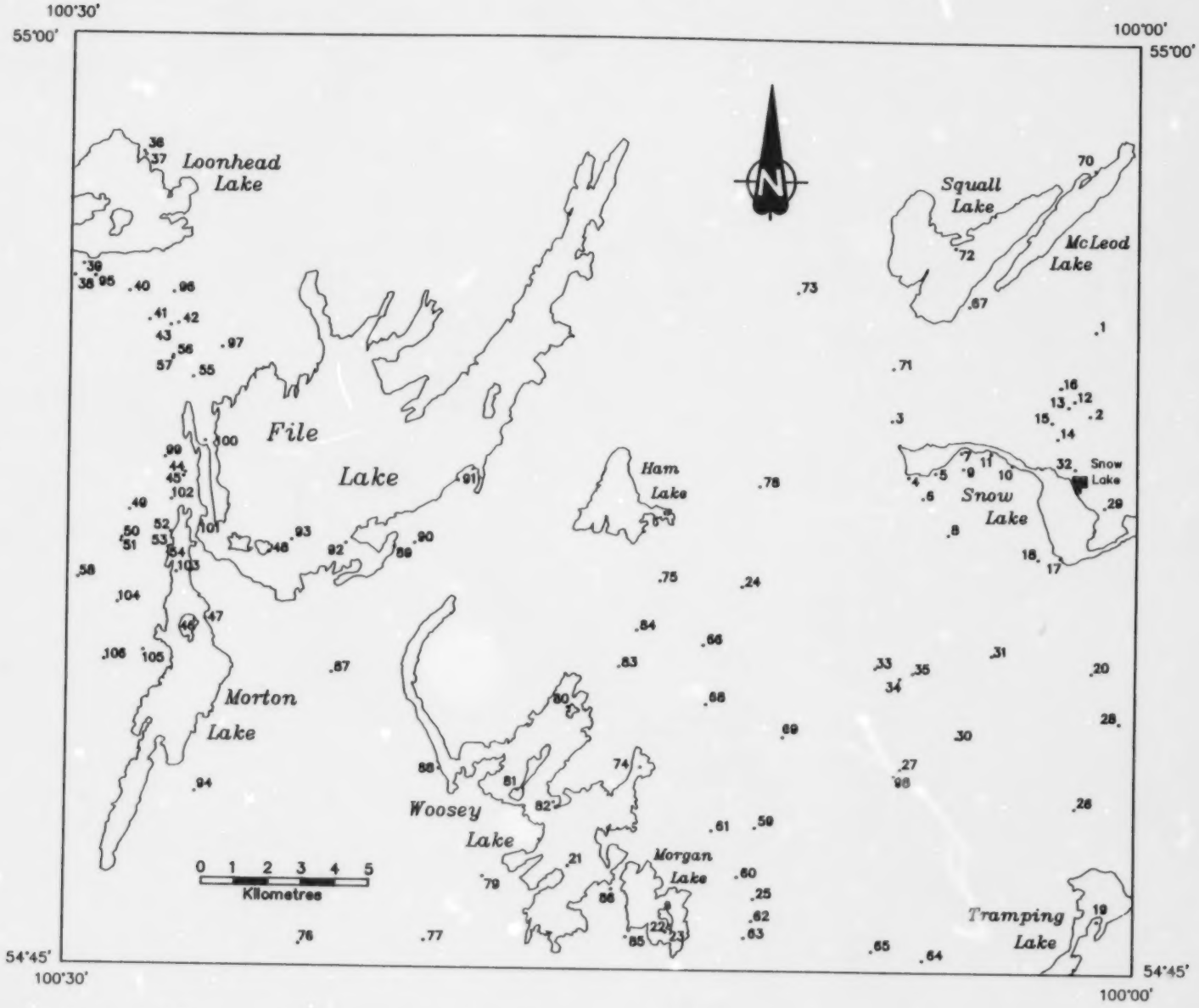


*Figure 1: Location of mineral deposits and occurrences (63K/16)*

example a disseminated narrow chalcopyrite layer is emphasized rather than a much thicker solid pyrite-graphite layer.

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**TABLE 1: MINERAL DEPOSIT TYPES**

**STRATABOUND MASSIVE SULPHIDE TYPE DEPOSITS**
- a) Volcanic rock associated
- b) Sedimentary rock associated
- c) Alteration zone associated with a or b

CHEMICAL SEDIMENT TYPE DEPOSITS
- a) Sulphide facies iron formation
- b) Oxide facies iron formation
- c) Carbonate facies iron formation
- d) Silicate facies iron formation
- e) Other chemical sediments

VEIN TYPE DEPOSITS
- a) Single vein
- b) Multiple veins or lenses
- c) Stockwork

MAGMATOGENIC TYPE DEPOSITS ASSOCIATED WITH MAFIC/ULTRAMAFIC ROCKS
- a) Disseminated
- b) Layered
- c) Net textured
- d) Podiform

DEPOSITS WITH PORPHYRY AFFINITIES
PEGMATITE TYPE DEPOSITS
CLASTIC SEDIMENT TYPE DEPOSITS
REPLACEMENT TYPE DEPOSIT
NOT CLASSIFIED DEPOSITS

---

**Mineralization:**

A symbol is used to denote the percentage and/or type of mineralization present. At some localities more than one type of mineralization is present. The type of mineralization displayed in the symbol represents the mineralization with the greatest economic potential as indicated by the deposit type symbol. It should be noted that in the context of this report a "sulphide facies iron formation" is equivalent to a "sulphide stratum". For a discussion of sulphide stratum the reader is referred to Gale et al. (1980).

**Host Rocks:**

In general, this description refers to the immediately underlying and overlying rock types. When a number of rock types are present in an extensive zone of mineralization, the most common rock types are indicated.

**Elements:**

This description allows for a maximum of three metals present in increasing order of abundance by volume. The precious and base metals are indicated in preference to elements such as iron and carbon.

In some instances it has been more efficient on the map and in the report to make reference to an area of mineralization rather than individual deposits or occurrences. All mineralization in the area delineated by a dotted line on the map is referenced in the report under the location number within that area.

**FORMAT OF MINERAL DEPOSIT REPORTS**

**Location:**

Each deposit or occurrence description will contain the unique deposit reference number, deposit or claim name where applicable, UTM coordinates, general area description, the reference number of the airphoto on which the deposit can be located and a brief description of method(s) of access.

**Exploration Summary:**

This section provides a summary of the extent of exploration. Information for this section was compiled from Mineral Inventory Cards, cancelled Assessment Files, and maps and files from the Mining Recording Office.

**Geological Setting:**

In this section the general geology of a deposit or occurrence is described. The information levels of the descriptions vary considerably and depend largely upon the extent of geological mapping during the documentation project. For further details the reader should consult the references cited.

**Mineralization:**

A detailed description of the mineralization provides the reader with the opportunity to make their own evaluation of the significance of a mineral occurrence or deposit.

**Geochemical Data:**

In addition to detailed geological mapping around individual mineral occurrences, rock samples were routinely collected from trenches and outcrop in the vicinity of the occurrences. Multi-element analyses are presented for 162 rock samples collected from mineral occurrences 1 to 57. Details of the sampling and analytical procedures are presented in Appendix I along with multi-element geochemical data.

**Classification:**

In this section the geologist may indicate the reasons for the classification appearing on the Mineral Deposit Map. For those localities containing more than one deposit type, the deposit types not shown on the map are documented here.

**References:**

These include both published and unpublished sources. For published and assessment report information the reader should obtain desired material directly from the source. The mineral deposit geologists will endeavour to supply copies of unpublished material on a deposit by deposit basis. References listed at the end of

each occurrence description may also include sources of additional information not directly cited in the text.

**Abbreviations:**

The following abbreviations are used throughout the occurrence descriptions:

| | |
|---|---|
| A.F. | Assessment file |
| g/t | Grams per tonne |
| oz/ton | Ounces per ton |
| HBED | Hudson Bay Exploration and Development Company Limited |
| HBM&S | Hudson Bay Mining and Smelting Company Limited |
| DDH | Diamond drill hole(s) |
| EM | Electromagnetic |
| CNR | Canadian National Railway |
| Hwy. | Highway |
| Fe | Iron |
| Mg | Magnesium |
| Cu | Copper |
| Zn | Zinc |
| Pb | Lead |
| Au | Gold |
| Ag | Silver |
| py | Pyrite |
| po | Pyrrhotite |
| cp | Chalcopyrite |
| v.f.g. | Very fine grained |
| f.g. | Fine grained |
| m.g. | Medium grained |
| c.g. | Coarse grained |

This mineral deposit report and the accompanying map are intended to be active documents that can be updated as new information becomes available. Although revisions of the publication are anticipated, any additional unpublished information may be obtained by contacting the authors or the Director, Geological Services Branch.


**ACKNOWLEDGMENTS**

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Junior Geological Assistants - Roy Eccles, Daryl Sadowski, Brian Keller

1985: Senior Geological Assistant - Roy Eccles
Junior Geological Assistants - Tim Robbie, Chris Roney, Greg Schmidt

1986: Junior Geological Assistants - Tim Robbie, Chris Roney, Greg Schmidt

1987: Junior Geological Assistant - Craig Malis

1988: Junior Geological Assistant - Craig Malis

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Typing - Leah Chudy, Shirley Weselak, Lynne Bobier
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## GEOLOGY OF AREA 63K/16

The geological base for mineral deposit map sheet 63K/16 is based on the one inch to one mile map of Harrison (1949), the 1:20 000 map of Bailes (1980), the 1:50 000 map of Froese and Moore (1980) and the 1:15 840 map of Bailes (1987b). In the File Lake-Snow Lake area supracrustal rocks have been divided into volcanic and derived sedimentary rocks of the Amisk Group, and overlying sedimentary rocks of the Missi Group.

The Amisk Group are the oldest rocks in the Flin Flon-Snow Lake belt. Total rock Rb/Sr and K/Ar determinations from the Flin Flon area (Mukherjee et al., 1971) and more recent U-Pb zircon ages (Gordon et al., 1987) favour an Aphebian age for the volcanic rocks, the earliest extrusive event occurring at approximately 1900 Ma. The Amisk Group in the File Lake-Snow Lake area comprises mafic to felsic volcanic rocks with intercalated volcanogenic sedimentary units that become dominant near the top of the succession (Harrison, 1949; Froese and Moore, 1980; Bailes, 1980; Walford and Franklin, 1982). Chemically, the volcanic rocks exhibit tholeiitic affinities (Bailes, 1988). The prevalence of pillowed flows, mafic to felsic volcanism, submarine volcaniclastic and turbidite deposits and the tholeiitic chemical affinity displayed by the least altered mafic volcanic rocks suggest deposition in an island-arc tectonic environment (Bailes, 1988).

At File Lake Bailes (1980) estimated the dominantly volcanic succession to be at least 2000 m thick with 80% mafic flow rocks and related breccias, and local thick accumulations of felsic volcanic rocks.

In the Snow Lake area felsic and mafic volcanic rocks are equally abundant (Walford and Franklin, 1982). Furthermore, up to 1000 m of volcanogenic greywacke, siltstone and mudstone overlying the volcanic rock sequence has also been assigned to the Amisk Group (Bailes, 1980; Froese and Moore, 1980). This turbidite succession and the substantial volume of felsic volcanic rocks (particularly in the immediate vicinity of Snow Lake) distinguish the Amisk Group in this area from that elsewhere in the Flin Flon greenstone belt.

At Flin Flon the contact between the Missi Group rocks and subaerially weathered Amisk Group volcanic rocks is marked by a major angular unconformity. The Missi Group in the map area differs from the Missi Group at its type localities in the Flin Flon region by the relative absence of conglomerate layers and apparently conformable deposition over turbiditic greywacke units (Bailes, 1980; Froese and Moore, 1980). Froese and Moore (1980) describe rocks of the Missi Group at Snow Lake as a sequence of metamorphosed lithic arenites.

Shanks and Bailes (1977) and Gordon and Gall (1982) have identified a subaerial volcanic component within Missi Group rocks east of Wekusko Lake. The volcanic rocks are predominantly fragmental felsic units that include welded tuffs; however, massive intermediate flows and related breccias occur locally.

The earliest intrusions recognized throughout the Flin Flon-Snow Lake greenstone belt are synvolcanic mafic to felsic sills and dykes, and granitoid, commonly porphyritic plutons that are restricted to the Amisk Group and related to Amisk volcanism (Walford and Franklin, 1982). Strongly differentiated gabbroic sills, some possibly synvolcanic, have been described in the File Lake (Bailes, 1980) and Snow Lake (Williams, 1966) areas.

Metamorphism probably commenced during the waning stages of Missi magmatism (1832 +/- 2 Ma) and continued to approximately 1800 Ma (Gordon et al., 1987) Regional metamorphism throughout the greenstone belt exhibits a general increase in grade from south to north (Harrison, 1949; Froese and Moore, 1980) with grades of metamorphism in the Snow Lake area generally higher than those documented elsewhere in the belt. Froese and Moore (1980) recognized four metamorphic zones ranging from a lower amphibolite zone northwards to an upper amphibolite zone. These zones are: (1) chlorite-biotite, (2) chlorite-biotite-staurolite, (3) biotite-staurolite-sillimanite, and (4) biotite-sillimanite-garnet. Despite the higher grades of metamorphism in this area primary depositional features are relatively well preserved in both the volcanic and sedimentary rocks; however, massive sulphide deposits in this region and related footwall alteration zones exhibit coarse grained recrystallization textures with spectacular growths of metamorphic minerals.

Three periods of folding have been recognized, all considered post-Missi (Bailes, 1980; Froese and Moore 1980). Early isoclinal folds have been refolded about northeastery trending open folds (e.g., the Threehouse Syncline at Snow Lake). At File Lake Bailes (1980) has recognized a third folding event consisting of easterly trending open flexural folds. Deformation associated with minor folds that postdate the second phase of folding in the Snow Lake area were observed in the immediate vicinity of gneissic domes on the north margin of the belt and are related to increased tightening of second phase folds (Froese and Moore, 1980). The McLeod Road Thrust Fault (Russell, 1957), a major structural break in the Snow Lake area, is interpreted to represent a nappe structure associated with the early isoclinal folding event (Froese and Moore, 1980).

Numerous past and presently producing volcanogenic base metal massive sulphide-type mineral deposits are present in area 63K/16. Bailes (1987a) has mapped a stratigraphic sequence of altered subaqueous volcanic rocks including massive and pillowed mafic flows, heterolithic and monolithic felsic and mafic volcanic breccia and wacke that extend from Cook Lake to Morgan Lake. This sequence hosts the Chisel Lake Zn-Cu deposit (location 33), Ghost Lake Zn-Cu deposit (location 35), Lost Lake Zn-Cu deposit (location 34) and

Pot Lake Zn-Cu deposit (location 25). The stratigraphic and structural top of the Amisk volcanic rocks is characterized by a heterolithic volcanic breccia unit that includes silicified and Fe-Mg metasomatized felsic and intermediate tuff, the Morgan Lake Zn deposit (location 23), and Au occurrence 22.

In addition to base metal mineralization several Au occurrences are located northeast of the McLeod Road Thrust Fault, northeast of the town of Snow Lake. The most notable is the Nor-Acme Au deposit (location 32). The occurrences are controlled by left lateral faults and shear sets that trend 330°-340° and 260°-290°, respectively, and appear to merge with the McLeod Road Thrust Fault (Galley et al., 1988).

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## MINERAL DEPOSITS AND OCCURRENCES: FILE LAKE AREA (63K/16)

**LOCATION:** 1

NAME: HERBLET LAKE
UTM: 6086569N/434664E
ACCESS: Boat or bush aircraft.

AREA: West of Southwest Bay, Herblet Lake.
AIRPHOTO: A26366-199

EXPLORATION SUMMARY:

The property was first staked as the Koanna 3 claim in 1943 by Glen Rapson. Ownership was transferred to Strategic Explorations Syndicate in 1944, and again in 1946, and to the Consolidated Mining and Smelting Company of Canada Limited in 1944; the claims were cancelled in 1958. Work undertaken on the Koanna group during this period includes geologic mapping, trenching and diamond drilling of two holes (total 102 m; A.F. 90042, 90143). In 1956 the Ram 479 Fraction was staked by K.A. Camay on behalf of HBED and was included in a ground electromagnetic survey (A.F. 90017). The claim was cancelled in 1958. W.B. Kobar staked the area in 1969 and transferred his interests to Fosco Mining Ltd. in 1970. Fosco Mining Ltd. conducted an airborne magnetic and electromagnetic survey (A.F. 92130). The claim lapsed in 1973. W. Bruce Dunlop Limited held the ground from 1974-1976. Gold Fields Resources Canada Limited acquired the ground in 1981 and transferred ownership to Darius Gold Mine Incorporated (1981), HBM&S (1985-86) and Snow Lake Mines Limited (1986 - current). Magnetometer and VLF-EM surveys and diamond drilling were undertaken by Gold Fields in 1983 (Mineral Inventory Card 63K/16NE Au2).

GEOLOGICAL SETTING:

The general area of occurrence 1 (Fig. 1-1) is underlain by Missi Group lithic arenite and lesser Amisk Group mafic volcanic rocks (Froese and Moore, 1980). At the occurrence the lithic arenite is intruded by an amphibolite (Fig. 1-2). Faint green layers within the arenite may indicate the presence of calc-silicate minerals. The biotite-sillimanite-almandine metamorphic isograd occurs in proximity to occurrence 1.

MINERALIZATION:

Disseminated, up to 10%, fine- to coarse-grained (1-7 mm) arsenopyrite and pyrite occur at the vein/wall rock contact between regularly spaced nonmineralized white quartz veins and arenite. The veins are 1-5 cm thick, but may attain thicknesses of 2 m (Fig. 1-2). The dominant orientation of the veins is 082°/85°S. Arenite adjacent to the quartz veins has been silicified for up to 5 cm from the vein/ wall rock contact. Lateral continuity of quartz veins is uncertain due to the lack of outcrop.

Diamond drilling by Glen Rapson in 1949 (A.F. 90143) intersected sections of diorite and altered sedimentary gneiss containing disseminated arsenopyrite and pyrite. Assay results were not included in the assessment report.

GEOCHEMICAL DATA:

Sixteen rock samples were collected for assay at the occurrence (Fig. 1-2). The highest Au value obtained was 31 600 ppb Au (sample 841141); six other samples contained more than 100 ppb Au. Samples that yielded anomalous Au values were also high in As with a maximum value of 32 900 ppm As. Cu, Zn, and Pb values were all less than 100 ppm. Samples 1403-1407 comprise a continuous channel sample across the mineralized zone at 2 m intervals. Results of geochemical analyses are included in Appendix I.

CLASSIFICATION:

Vein-type deposit. Multiple veins or lenses of nonmineralized quartz in auriferous lithic arenite.

REFERENCES:


Assessment Files 90017, 90042, 90143, 92130
Manitoba Energy and Mines, Minerals Division.

Froese, E. and Moore, J.M.
1980: Metamorphism in the Snow Lake area, Manitoba; Geological Survey of Canada, Paper 78-27, 16 p.

Gonzales, A. and Fedikow, M.A.F.
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Mineral Inventory Card 63K/16NE Au2
Manitoba Energy and Mines, Minerals Division.

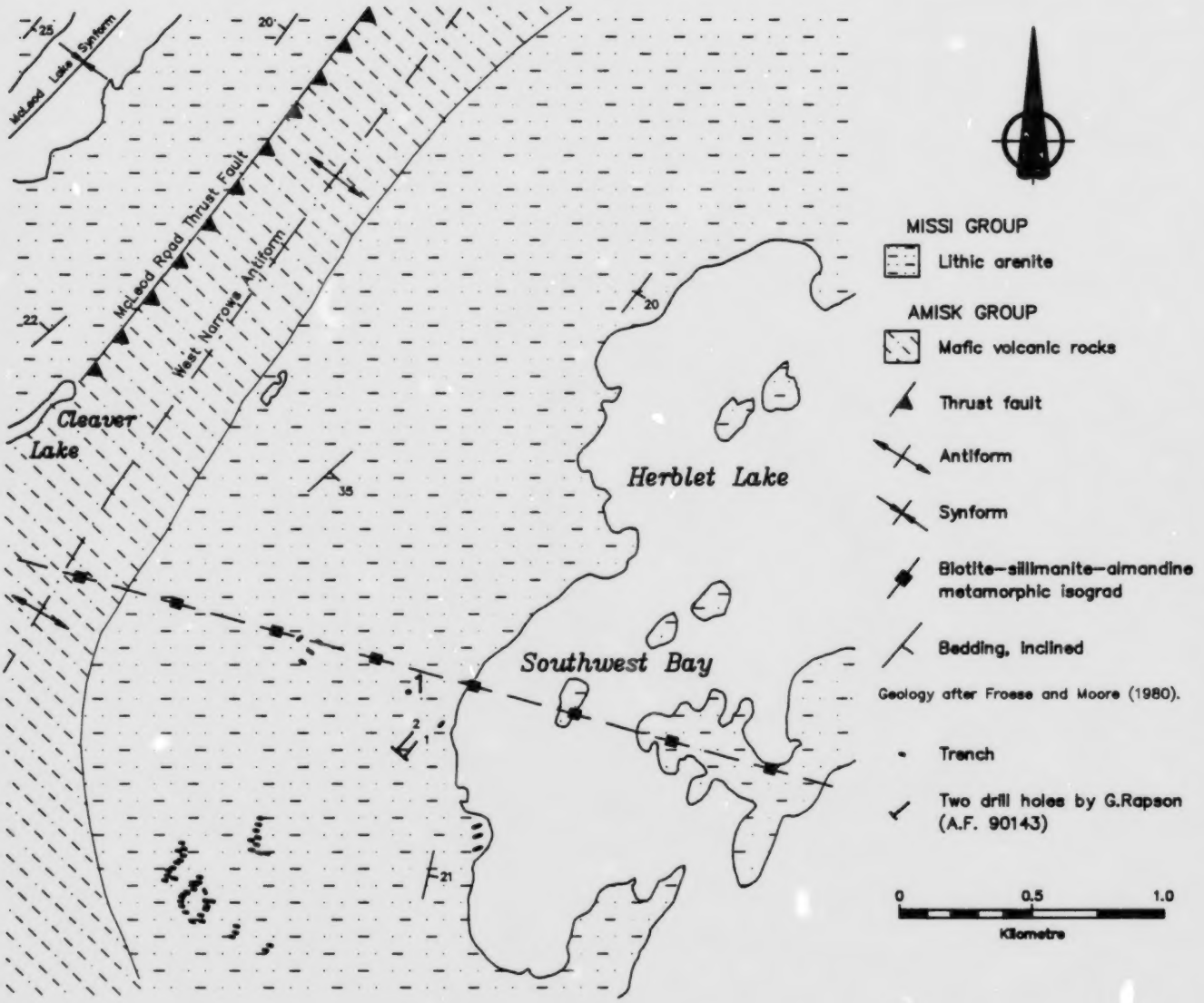


*Figure 1-1: Geological setting of occurrence 1*

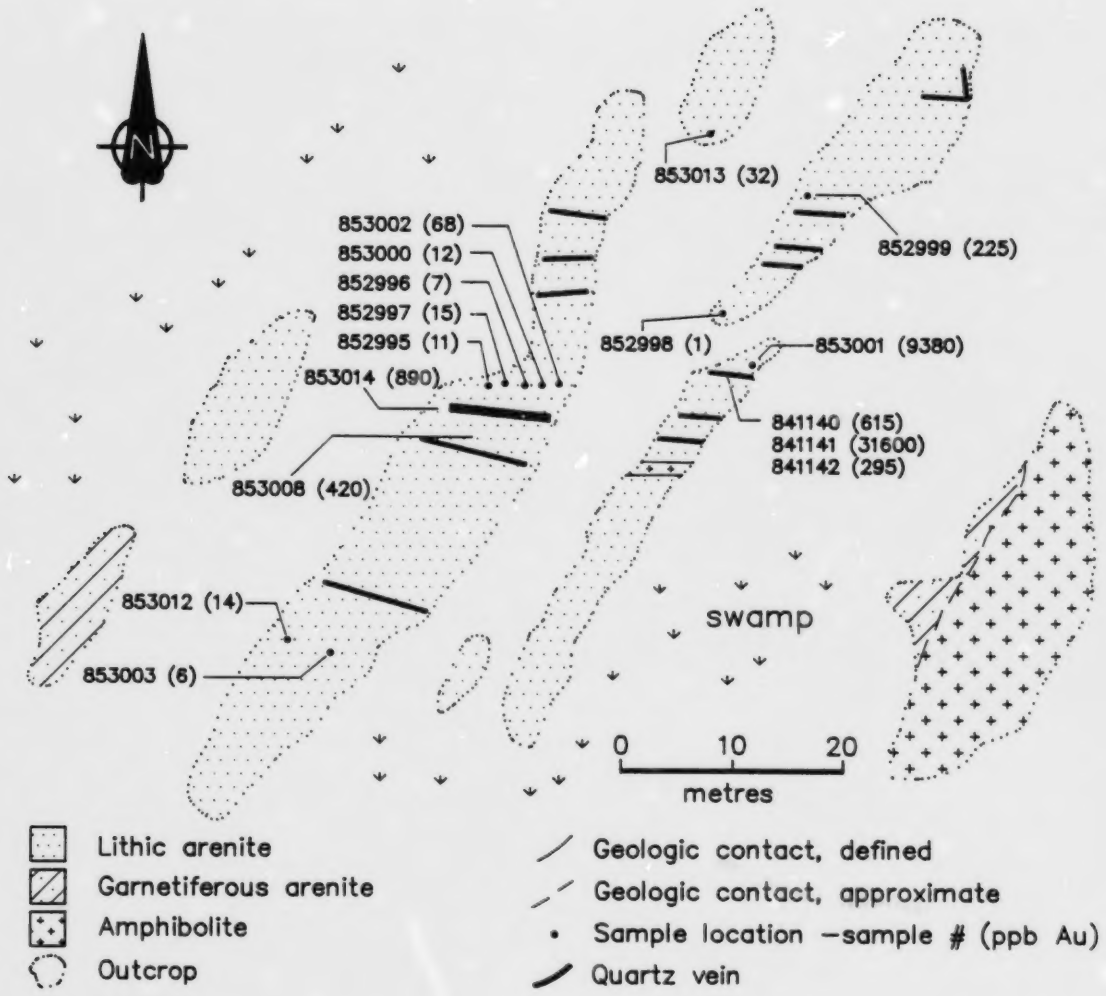


*Figure 1-2: Outcrop distribution, geology and sample locations at occurrence 1*

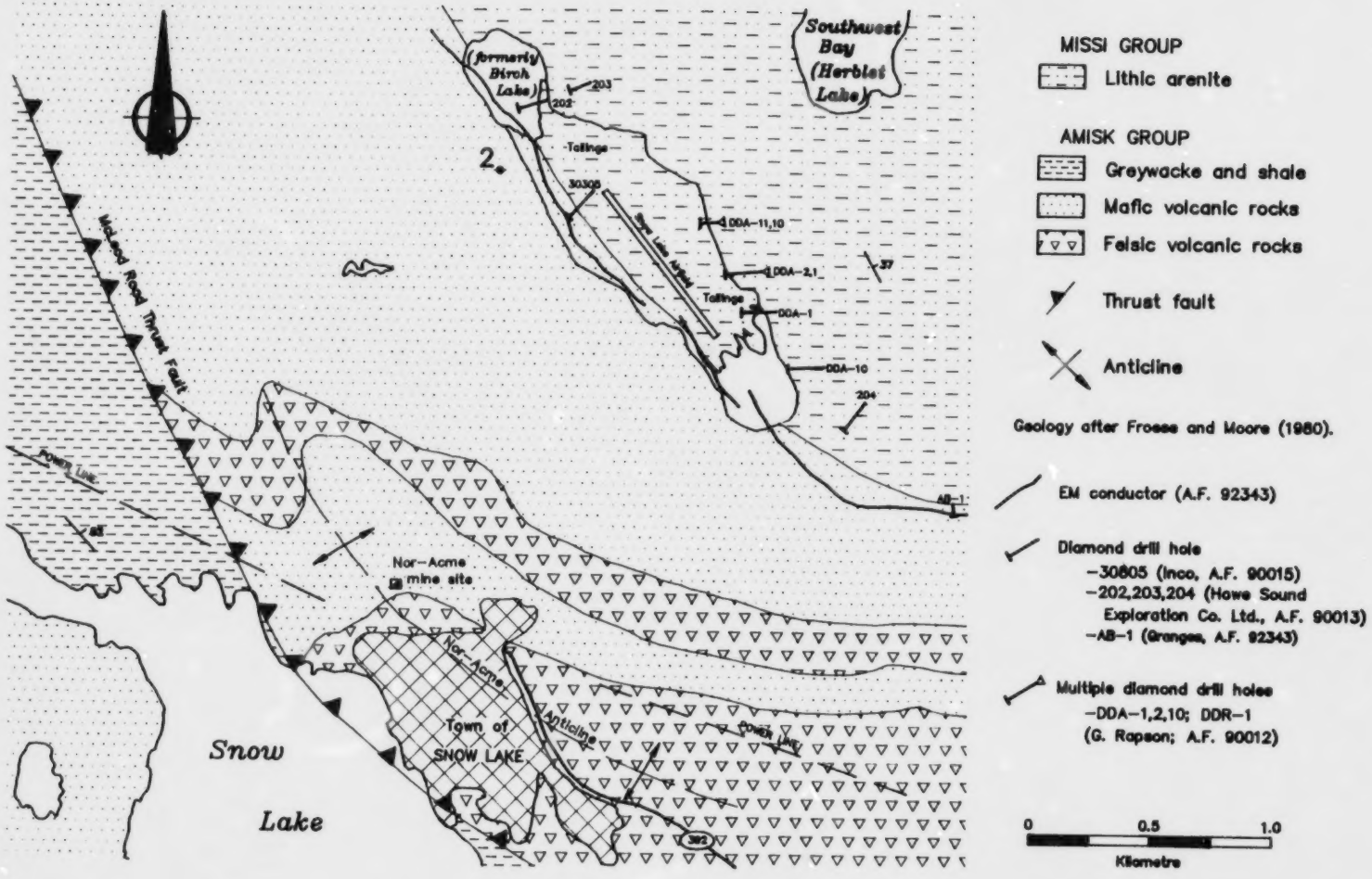


*Figure 2-1: Geological setting of occurrence 2*

**LOCATION: 2**

NAME: BIRCH LAKE WEST (DICK 18)

UTM: 6084045N/434480E

ACCESS: Occurrence 2 is adjacent to a cross-country ski trail west of Birch Lake (Fig. 2-1). Birch Lake is now largely infilled by mine tailings and supports the Snow Lake airfield.

AREA: West shore of Birch Lake.

AIRPHOTO: A26366-202

EXPLORATION SUMMARY:

The Dick 18 claims were first staked in 1942 for Nor-Acme Gold Mines Limited by C.R. Parres and were leased to Nor-Acme from 1943 to 1964 (Mineral Inventory Card 63K/16 Au14). Subsequently, Canadian Nickel Company Limited (1965-1970), Nor-Acme Gold Mines Limited (1971-1974) and Granges Exploration Aktiebolag (1978-1980) held the ground during the years indicated. A ground magnetometer survey was performed in 1965 (A.F. 90163), a ground electromagnetic survey was conducted in 1971 (A.F. 90203) and a horizontal loop EM survey was conducted in 1980 (A.F. 92343). Electromagnetic conductors delineated by these surveys are displayed on Figure 2-1. HBED has held the ground since 1981.

GEOLOGICAL SETTING:

The general area of occurrence 2 is underlain by Amisk Group mafic volcanic rocks. Missi Group lithic arenite occurs to the northeast and Amisk Group felsic volcanic rocks, greywacke and shale occur to the southwest (Fig. 2-1). The McLeod Road Thrust Fault crosscuts the western part of the area. At the occurrence the predominant rock types are garnetiferous, tuffaceous and locally silicified mafic volcanic rocks, strongly foliated siliceous sedimentary rocks and diorite.

MINERALIZATION:

Disseminated, up to 10%, fine grained chalcopyrite, pyrrhotite and pyrite occur in strongly foliated, siliceous and cherty sedimentary rocks that contain white, non-mineralized quartz veins. The sedimentary rocks have been intruded by a diorite dyke that contains 2-3% disseminated pyrrhotite (Fig. 2-2). All rock types at the occurrence are rusty weathered.

GEOCHEMICAL DATA:

Three rock samples were collected from the mineralized zone for analysis (Fig. 2-2): Results are listed in Appendix I. Cu values ranged from 131 to 331 ppm and Zn values from 88 to 135 ppm. Au and Ag values were very low (maximum 3 ppb Au).

CLASSIFICATION:

Disseminated mineralization - not classified.

REFERENCES:


Assessment Files 90012, 90013, 90015, 90163, 90203, 92343; Manitoba Energy and Mines, Minerals Division.

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1980: Metamorphism in the Snow Lake area, Manitoba; Geological Survey of Canada, Paper 78-27, 16 p.

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Mineral Inventory Card 63K/16NE Au14
Manitoba Energy and Mines, Minerals Division.

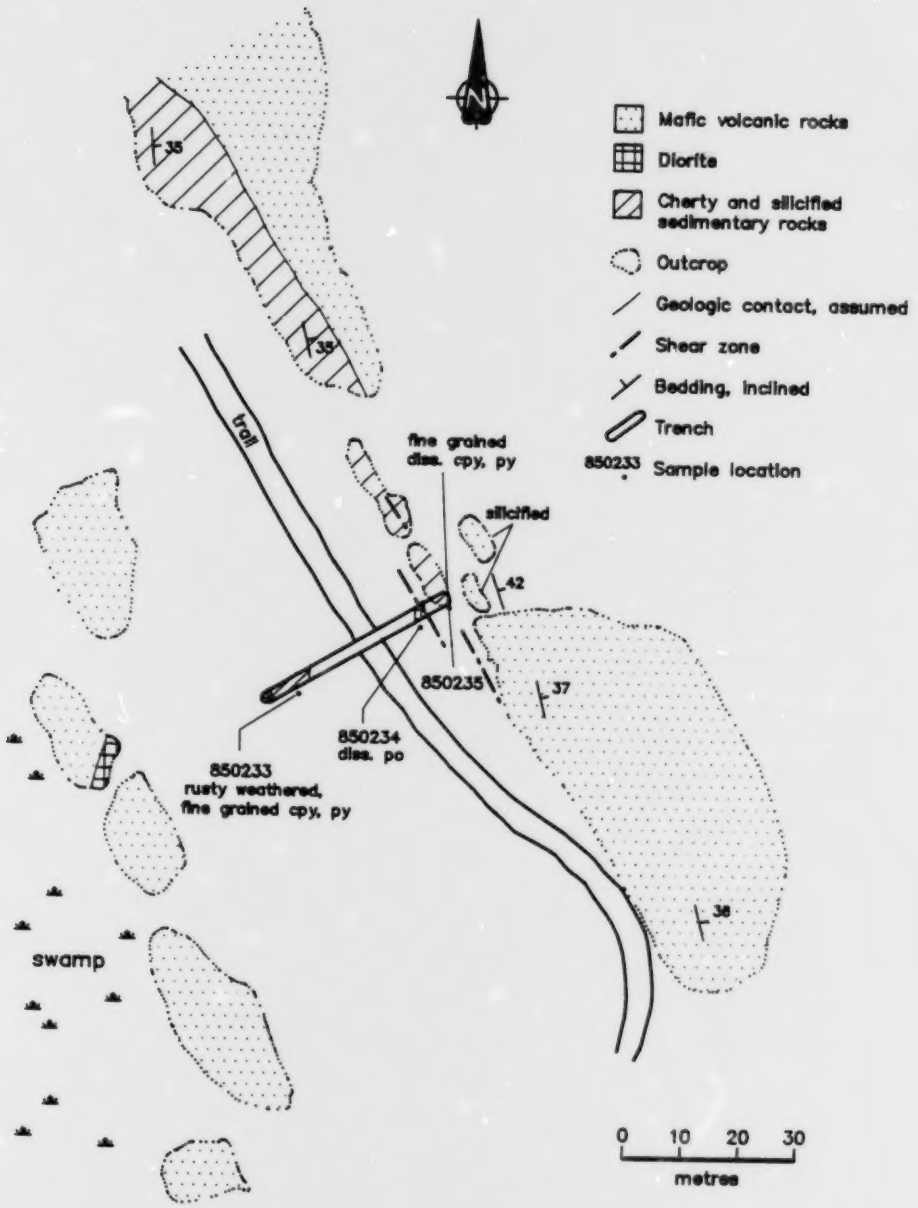


*Figure 2-2: Outcrop distribution, geology, trench and sample locations at occurrence 2*

**LOCATION: 3**

NAME: SQUALL CREEK JULIAN CLAIMS; JACKNUTT W DEPOSIT

UTM: 6083919N/428509E

ACCESS: Snow Lake to Squall Creek by boat and traverse.

AREA: 750 m north of west Snow Lake along Squall Creek.

AIRPHOTO: A26366-192

EXPLORATION SUMMARY:

Occurrence 3 was first staked as the J.E.R. 8 and 9 claims in 1945 by J. McKay; his interest was transferred to various individuals and finally to Leedoro Snow Lake Mines Limited in 1945. Leedoro Snow Lake Mines Ltd. performed a ground magnetometer survey, prospected and mapped the geology of the area. The claims lapsed in 1947. The Julian 1 and 2 claims were staked by Gaspard Richards in 1948 and were later transferred to Jack Nutt in 1949. Diamond drilling and the development of an open cut followed the discovery of scheelite in quartz veins by Mr. Nutt. Interest in the property was transferred to Leedoro Snow Lake Mines Ltd. in 1951. An adit was driven the same year. In 1951 Northern Tungsten Limited began exploration and development following an agreement and corporate re-organization with Leedoro Snow Lake Mines Ltd. Further diamond drilling defined 4535 tonnes averaging 2.5% $WO_3$. A 10 ton/day mill was erected (Mineral Inventory Card 63K/16 W1). Production took place during 1951 and 1952 but was abandoned due to low grades and sulphide contamination of the concentrate. W.B. Dunlop Limited, the current owner, gained control of the claims in 1985.

GEOLOGICAL SETTING:

The tungsten deposit occurs within a sequence of Amisk Group massive to pillowed mafic flows and associated flow breccia. The rocks contain a strong penetrative foliation parallel to Harrison's (1949) Snow Creek Fault that forms the contact between the mafic rocks and Amisk Group metasedimentary rocks immediately to the east (Fig. 3-1).

MINERALIZATION:

The deposit is composed of a series of planar quartz-feldspar-carbonate-scheelite veins that strike north and dip 40° east, parallel to the dominant foliation. The veins have been traced on surface and underground for over 50 m (Little, 1959).

Underground exposure reveals the presence of at least four parallel, scheelite-rich veins that are easily identified with an ultraviolet light. One zone is approximately 2 m wide, whereas the others are 10 to 20 cm. Wall rocks to the veins are strongly foliated and biotite-amphibole-rich, with fine grained crystals of arsenopyrite and pyrite aligned parallel to the foliation planes. In places the wall rock is strongly carbonatized, with secondary quartz-carbonate veins boudinaged parallel to the foliation, and buckled where they cross the fabric at a high angle. Harrison's (1949) description of the vein system on surface would suggest that the larger, scheelite-rich veins are also boudinaged along strike. Some tourmaline and possible green fluorite was also observed in the veins. This deposit was originally described as a gold occurrence. A summary of diamond drilling and some assay results from work undertaken by Leedoro Snow Lake Gold Mines (1946) is given in Figure 3-2. An outcrop, geology and sample location map is presented in Figure 3-3. Figure 3-4 presents a detailed map of the geology and surface workings at the occurrence.

GEOCHEMICAL DATA:

A 45 kg bulk sample taken by Jack Nutt in 1949 assayed 25.35% $WO_3$ (Mineral Inventory Card 63K/16 W1). A 954 kg hand-cobbed ore shipment made by Mr. Nutt in 1950 averaged 32.68% $WO_3$ (op cit.). Pit samples taken by Leedoro Snow Lake Mines Ltd. in 1946 contained nil to 1.0 g/t Au (Fig. 3-2). Nine samples (Fig. 3-3; Appendix I) of host rocks and quartz veins collected for this survey contained up to 1410 ppb Au.

CLASSIFICATION:

Vein-type occurrence. Multiple auriferous quartz-scheelite veins in a zone of strongly foliated and mineralized mafic volcanic rocks.

REFERENCES:


Assessment Files 90040, 91465, 91896
Manitoba Energy and Mines, Minerals Division.

EMR Canada Mineral Policy Sector; corporation files; "Leedoro Snow Lake Mines Ltd.";"Northern Tungsten Limited".

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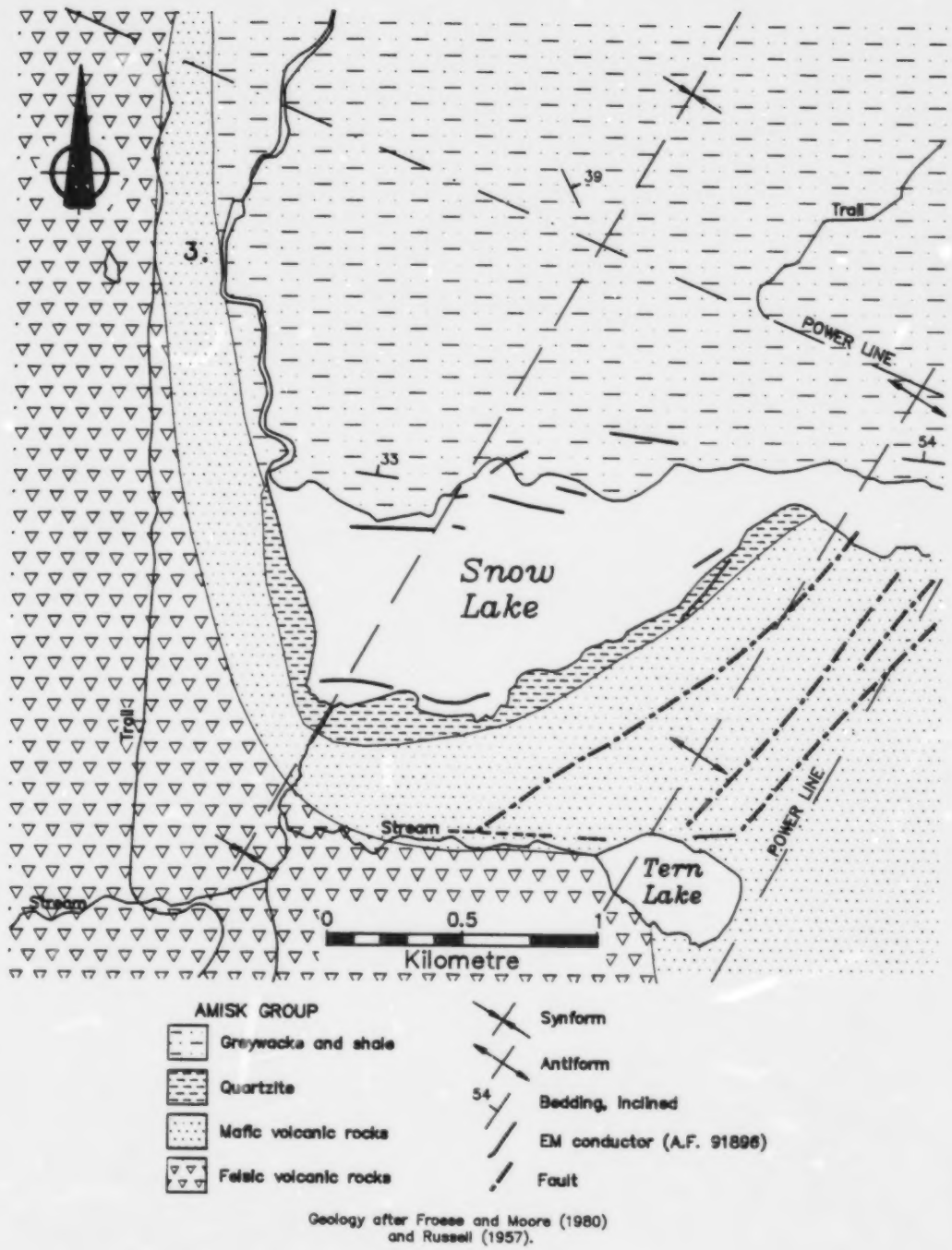


*Figure 3-1: Geological setting of occurrence 3*

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1957: Structural Studies of the Snow Lake-Herb Lake Area; Manitoba Department of Mines and Natural Resources, Mines Branch, Publication 55-3.

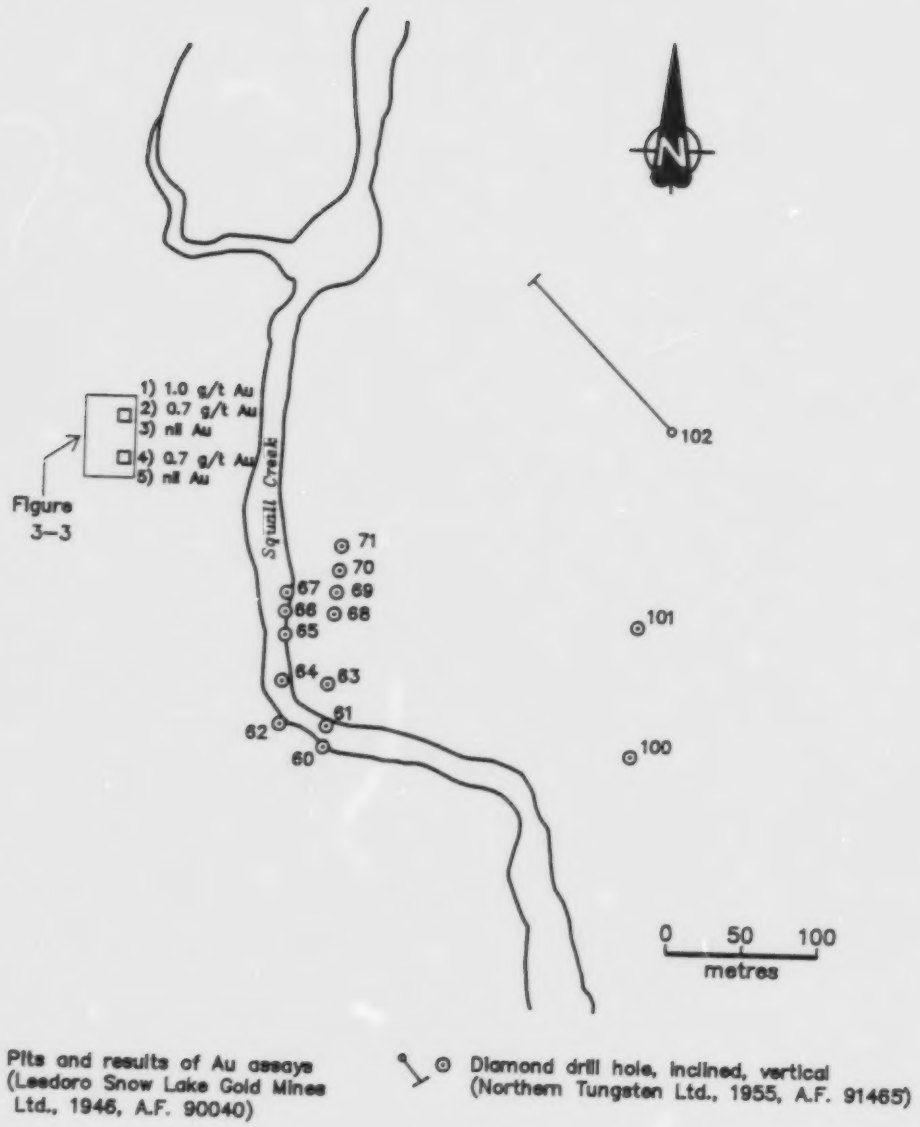


*Figure 3-2: Assay results, outcrop distribution and drill hole locations at occurrence 3*

*Figure 3-3: Outcrop distribution, geology and trench and sample locations at occurrence 3*

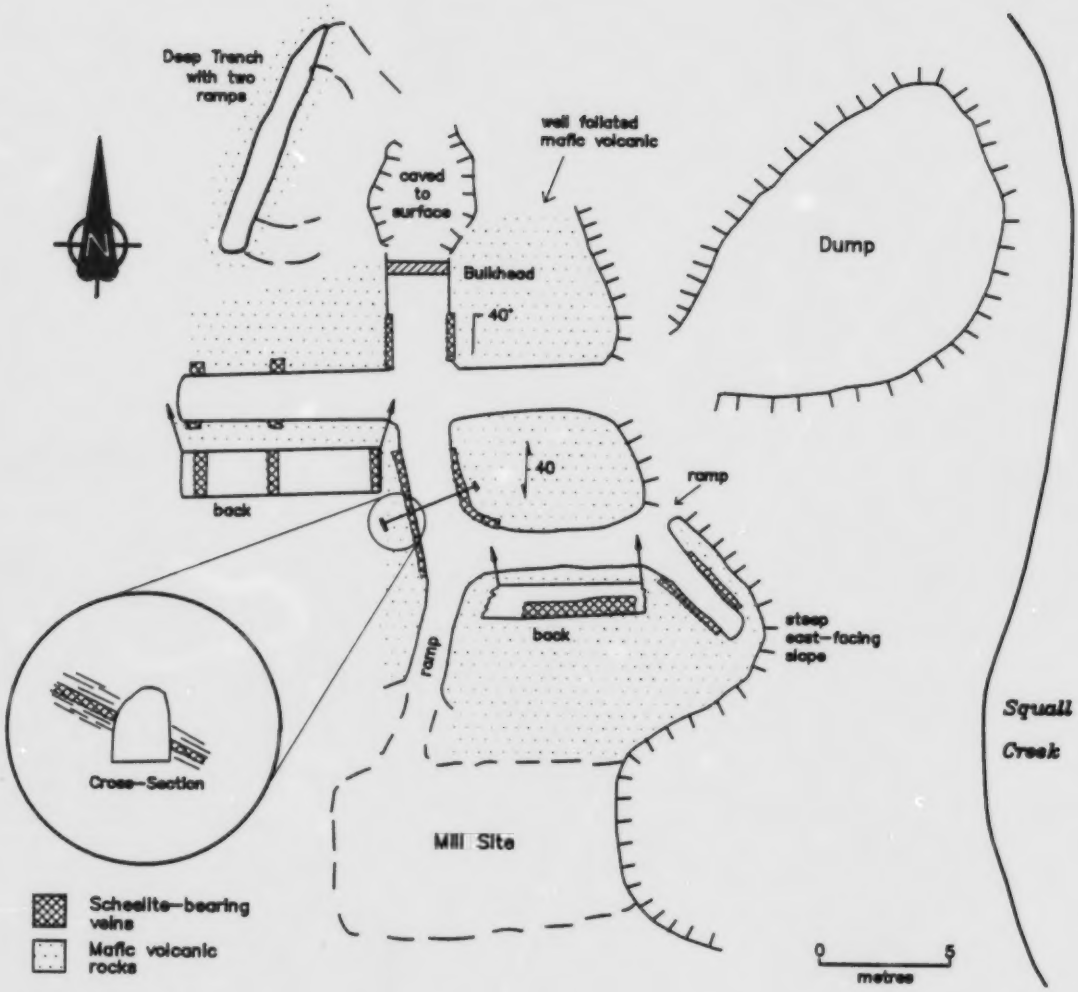


*Figure 3-4: Outcrop distribution, geology and surface workings at occurrence 3*

**LOCATION: 4**

NAME:

UTM: 6082230N/429013E

ACCESS: Snow Lake. The occurrence is approximately 40 m south of the southwesternmost point of West Snow Lake, and is exposed in a near vertical rock face on the north side of Tern Creek.

AREA: Snow Lake, at the mouth of Tern Creek.

AIRPHOTO: A26366-192

EXPLORATION SUMMARY:

The area near occurrence 4 has been held by a number of parties since the 1930's. A ground electromagnetic survey conducted by Ryanor Mining Company Limited in 1972 is the only work recorded in this area (A.F. 91896). HBM&S has held the ground (CB 5794) since 1977.

GEOLOGICAL SETTING:

The general area of occurrence 4 is underlain by quartzite, flanked to the north by greywacke and shale, and to the south by mafic and felsic volcanic rocks (Fig. 4-1). These rock units have been assigned to the Amisk Group. The McLeod Lake Synform has been mapped in the immediate area of the occurrence. The host rocks to the mineralization are strongly foliated, fine grained, ferruginous, calcareous and siliceous sedimentary rocks (Fig. 4-2).

MINERALIZATION:

Disseminated, up to 10%, pyrrhotite and arsenopyrite occur within white quartz veins hosted by foliated ferruginous and calcareous sedimentary rocks. The foliated sedimentary host rocks are silicified, and carbonatized . Disseminated iron sulphides were also observed in the sedimentary rocks.

GEOCHEMICAL DATA:

Four rock samples were collected for analysis (Fig. 4-2; Appendix I): all were low in Au (up to 14 ppb) and contained a maximum of 163 ppm Cu and 216 ppm Zn.

CLASSIFICATION:

Vein-type deposit with disseminated sulphide mobilizate in strongly foliated sedimentary rocks.

REFERENCES:

Assessment File 91896
Manitoba Energy and Mines, Minerals Division.

Froese, E. and Moore, J.M.
1980: Metamorphism in the Snow Lake area, Manitoba; Geological Survey of Canada, Paper 78-27, 16 p.

Gonzales, A. and Fedikow, M.A.F.
1984: Mineral deposit studies, Snow Lake area; in Manitoba Energy and Mines, Report of Field Activities 1984, p. 46-52.

Russell, G.A.
1957: Structural studies of the Snow Lake-Herb Lake area; Manitoba Mines Branch, Publication 55-3, 33p.

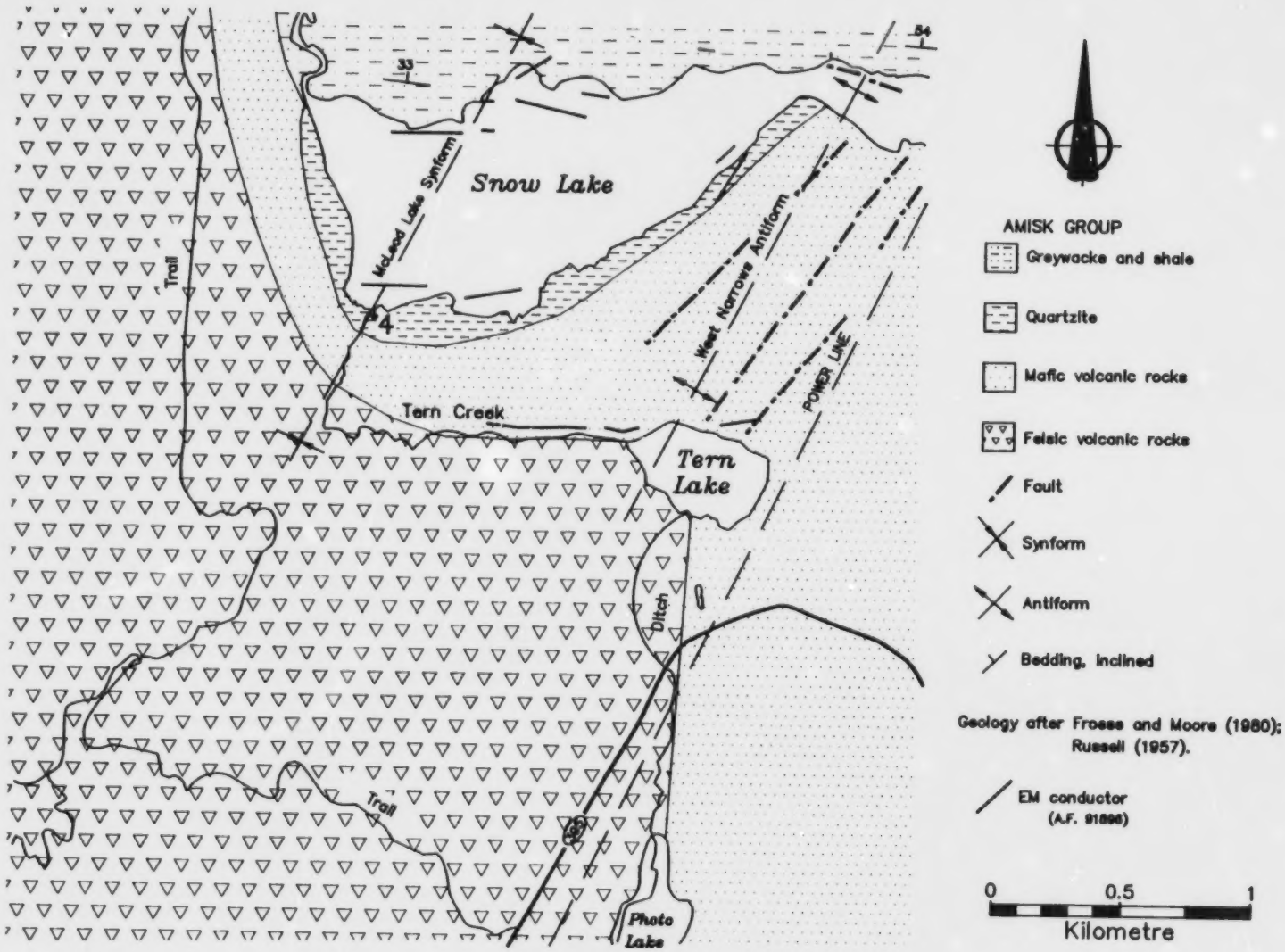


*Figure 4-1: Geological setting of occurrence 4*

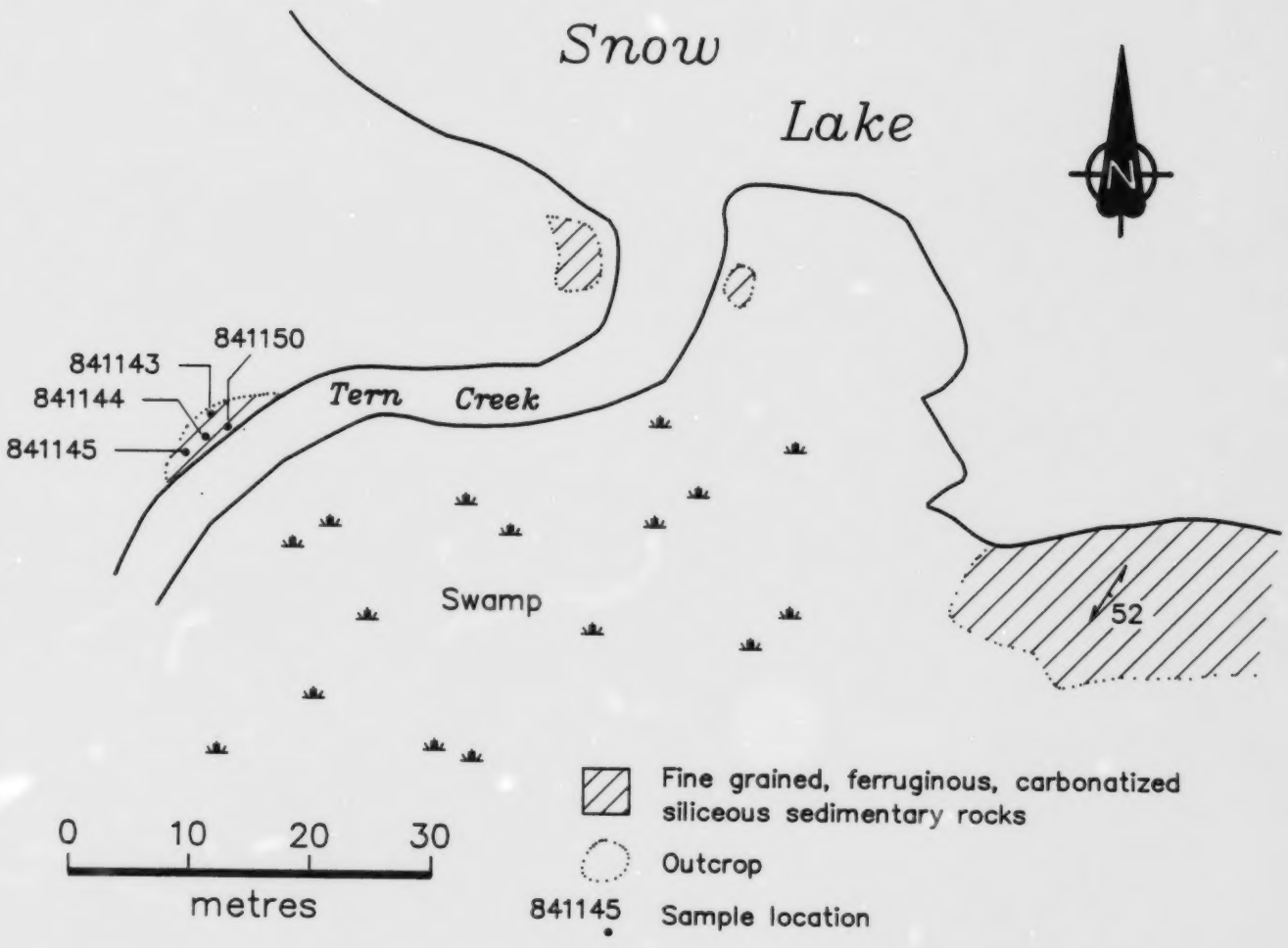


*Figure 4-2: Outcrop distribution, geology and sample locations at occurrence 4*

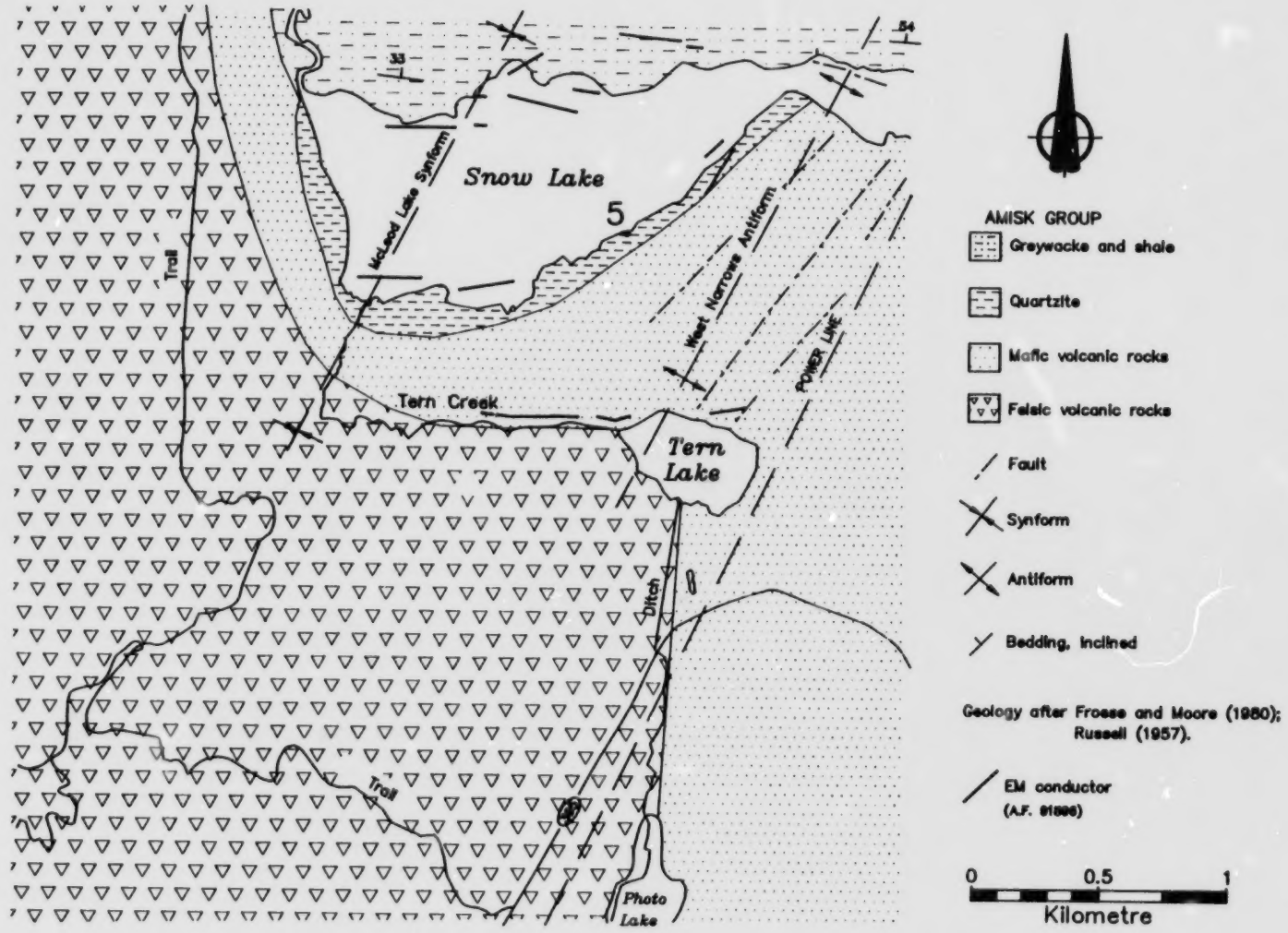


*Figure 5-1: Geological setting of occurrence 5*

**LOCATION: 5**

NAME: TERN LAKE PORTAGE SHOWING

UTM: 6082352N/429822E
ACCESS: Snow Lake.

AREA: Snow Lake, approximately 400 m east of the Tern Lake portage.
AIRPHOTO: A26366-192

EXPLORATION SUMMARY:

The N.O. No. 3 claim was staked in 1941 by Gaspard Richards. A total of 248 m of diamond drilling was recorded by Mr. Richards in 1944 (Mineral Inventory Card 63K/16 Au11). A series of transfers followed leading to acquisition of the property by Leedoro Snow Lake Mines Limited in 1946 (Mineral Inventory Card 63K/16 Au 11). Geological mapping and sampling were conducted by Leedoro in 1946 (A.F. 90040). Ownership of the claim was transferred to Tern Lake Mines Limited in 1948, who took out Lease M-2790 over the ground. The lease was cancelled in 1971. In 1971 the occurrence was staked on behalf of W.B. Dunlop Limited and was later assigned to Ruttan Lake Explorations Limited. Ground magnetometer and electromagnetic surveys were performed in 1973 and 1974 (A.F. 91896). HBED, the current owners, staked the ground in 1977.

GEOLOGICAL SETTING:

The general area of occurrence 5 is underlain by quartzite, flanked to the north by greywacke and shale and to the south by mafic and felsic volcanic rocks (Fig. 5-1). These rock units have been assigned to the Amisk Group. The occurrence is located between the McLeod Lake Synform to the west and the West Narrows Antiform to the east. The mineralization is hosted by interlayered chert and fine grained clastic sedimentary rocks containing carbonate. The rock units are strongly foliated with an orientation of 235°/65° northwest (Fig. 5-2).

MINERALIZATION:

Fine grained disseminated aggregates of pyrite (maximum 5%) occur in stratabound, iron-stained quartz veinlets and stringers. Tourmaline and red garnets occur at or near the vein/wall rock boundary. The mineralized zone is approximately 1 m wide at surface, but was described by Leedoro Snow Lake Mines Ltd. as being up to 6 m in width (A.F. 90040).

GEOCHEMICAL DATA:

Drill core samples (Macassa Mines Ltd.) contained a maximum of 2.1 g/t Au (unspecified core length; A.F. 90040). Four samples collected for analysis from the trenches contained a maximum of 625 ppb Au and 424 ppm As (Fig. 5-2; Appendix I). Zinc contents of 214 and 267 ppm were obtained in samples that contained elevated Au (samples 841155 and 841169; Appendix I). Cu and Ag contents are low.

CLASSIFICATION:

Vein-type deposit. Multiple stratabound veins and/or lenses of quartz in strongly foliated zones of interlayered sulphide-bearing siliceous siltstone and chert.

REFERENCES:


Assessment Files 90040, 91896
Manitoba Energy and Mines, Minerals Division.

Froese, E. and Moore, J.M.
1980: Metamorphism in the Snow Lake area, Manitoba; Geological Survey of Canada, Paper 78-27, 16 p.

Gonzales, A. and Fedikow, M.A.F.
1984: Mineral deposit studies, Snow Lake area; in Manitoba Energy and Mines, Report of Field Activities 1984, p. 46-52.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping Lakes area, Manitoba; Geological Survey of Canada, Memoir 250, p. 79-80.

Mineral Inventory Card 63K/16NE Au11
Manitoba Energy and Mines, Minerals Division.

Russell, G.A.
1957: Structural studies of the Snow Lake-Herb Lake area; Manitoba Mines Branch, Publication 55-3, 33 p.

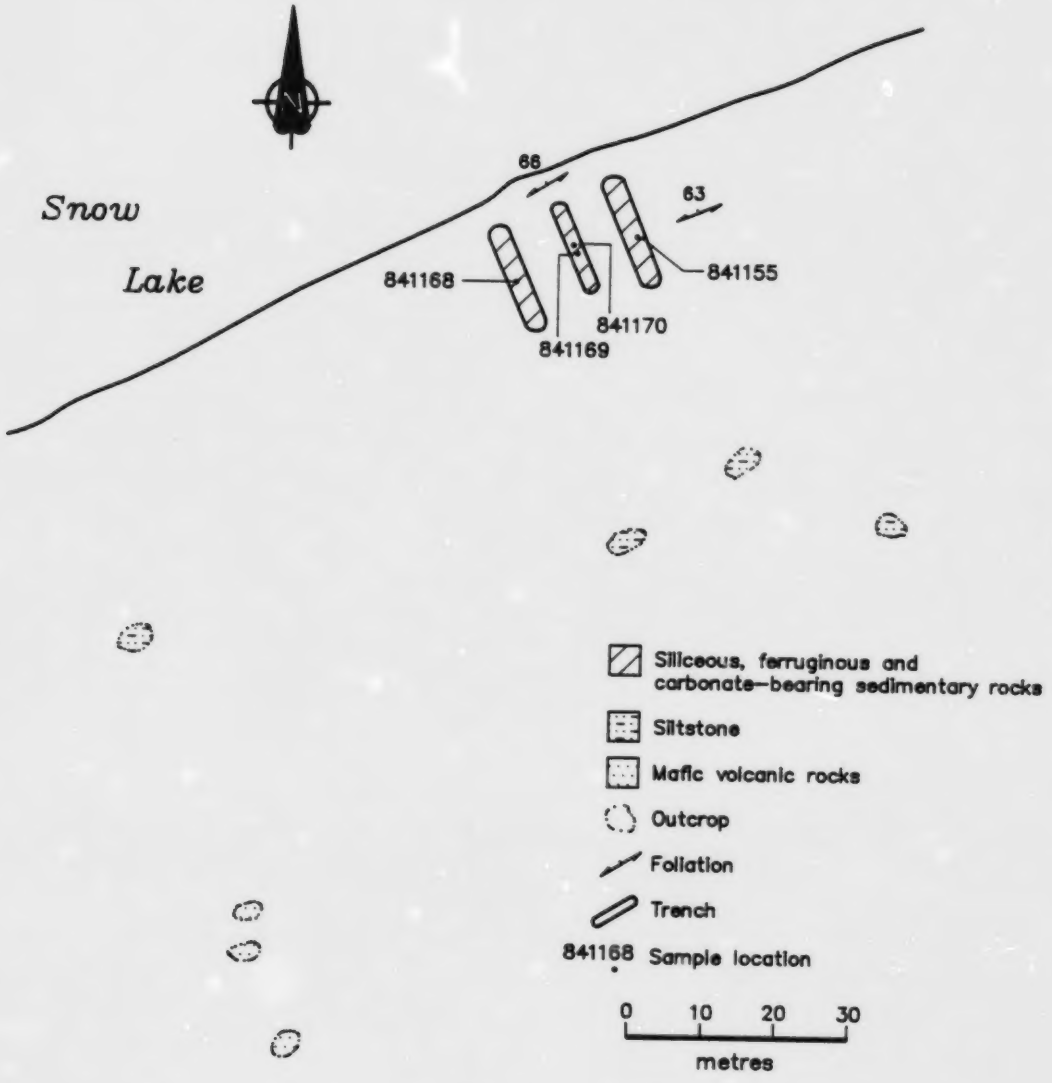


*Figure 5-2: Outcrop distribution, geology, trench and sample locations at occurrence 5*

**LOCATION: 6**

NAME: TERN LAKE

UTM: 6081595N/429426E

ACCESS: Traverse from Provincial Highway No. 395.

AREA: 625 m southwest of westernmost point on Tern Lake

AIRPHOTO: A26366-191

EXPLORATION SUMMARY:

The J.M. No. 4 claim was first staked in 1924 by Peter Stoltz (Mineral Inventory Card 63K/16 Pyr3). Subsequent owners include: J.B. Masso (1946), HBED (1955-1961) and Falconbridge Nickel Mines Limited (1968-1974). The ground is presently (1988) covered by C.B. 4992, recorded by HBED in 1977.

GEOLOGICAL SETTING:

The general area of occurrence 6 is underlain by felsic volcanic rocks, flanked to the north and east by mafic volcanic rocks, quartzite, greywacke and shale (Fig. 6-1). These rock units have been assigned to the Amisk Group. Occurrence 6 is hosted by fine grained, locally silicified, massive, flow banded and fragmental mafic volcanic rocks (Fig. 6-2). Rare garnet and K-feldspar are observed in the mafic units. Flow breccias consist of white-weathering felsic fragments in a mafic volcanic matrix. Fragments are elongate at 032° with a steep westerly plunge.

MINERALIZATION:

Two sets of trenches expose rusty weathered quartz veins up to 1.5 m wide containing disseminated pyrite, trace to minor magnetite and trace sphalerite and galena. Brown carbonate and minor white mica also occur in the veins. These veins trend 110°. The south trenches expose 2-3 m wide milky white quartz veins that strike 115°. Kaolinized pink feldspar and chloritic inclusions are common in the veins. Sulphide mineralization is similar to that observed in the northern trenches, but chalcopyrite and tennantite have also been reported (Harrison, 1949). Pyrite occurs in minor amounts in the wall rock. Overall, a maximum of 5% sulphide is observed at the occurrence.

GEOCHEMICAL DATA:

Five samples were collected from quartz veins in the trenches (Fig. 6-2); analyses are presented in Appendix I. Values for Au and Ag are low. Maximum values for Pb, Zn and Cu are 224 ppm, 207 ppm and 120 ppm, respectively.

CLASSIFICATION:

Vein-type deposit. Sulphide-bearing quartz veins in altered massive mafic volcanic flows. Strongly foliated rocks are associated with the northern set of veins.

REFERENCES:


Assessment File 91896
Manitoba Energy and Mines, Minerals Division.

Froese, E. and Moore, J.M.
1980: Metamorphism in the Snow Lake area, Manitoba; Geological Survey of Canada, Paper 78-27, 16 p.

Gonzales, A. and Fedikow, M.A.F.
1984: Mineral deposit studies, Snow Lake area; In Manitoba Energy and Mines, Report of Field Activities 1984, p. 46-52.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping Lakes area, Manitoba; Geological Survey of Canada Memoir, 250; p. 78-79.

Mineral Inventory Card 63K/16NE Pyr3
Manitoba Energy and Mines, Minerals Division.

Russell, G.A.
1957: Structural studies of the Snow Lake-Herb Lake Area; Manitoba Mines Branch, Publication 55-3, 33 p.

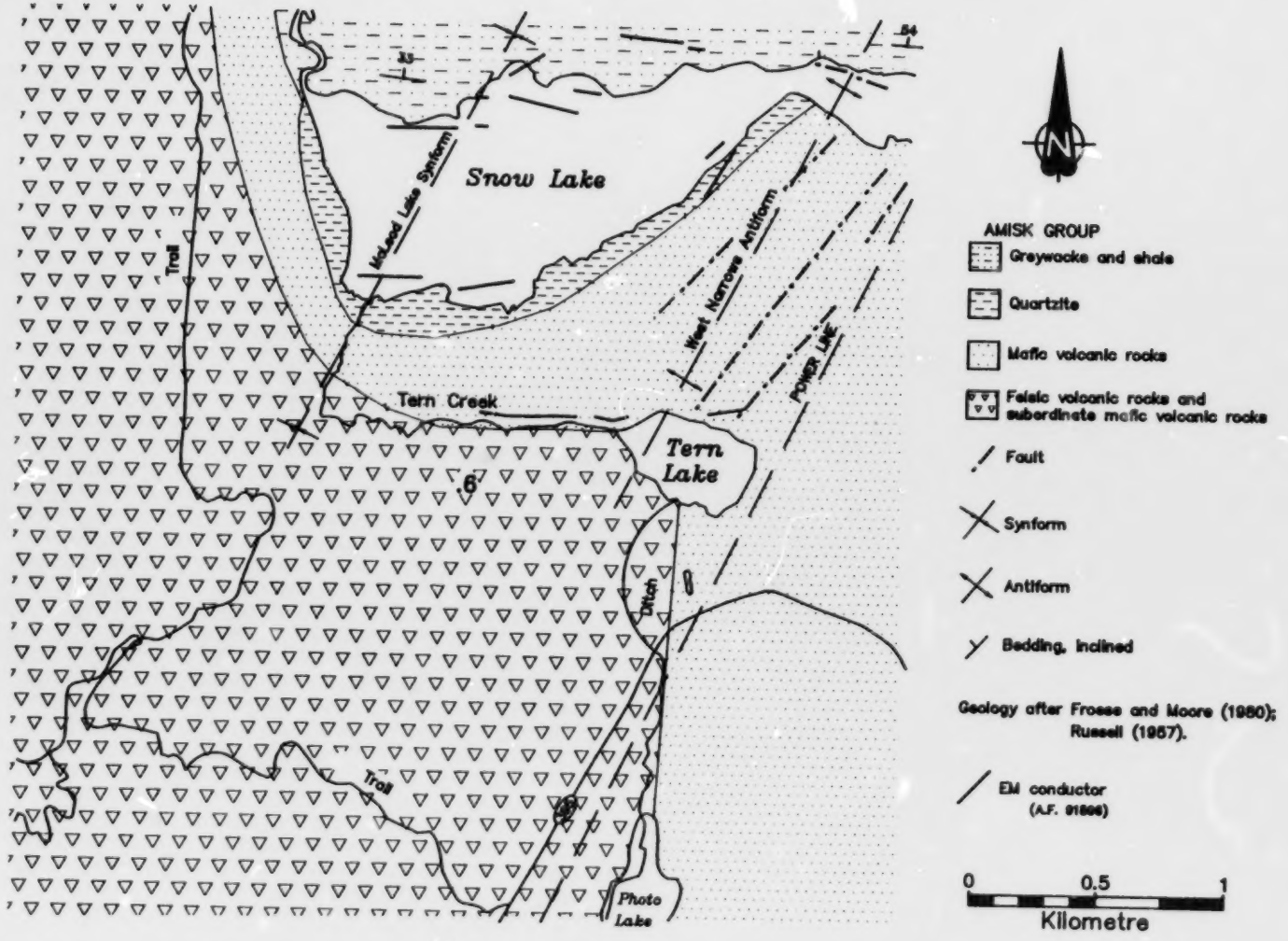


*Figure 6-1: Geological setting of occurrence 6*

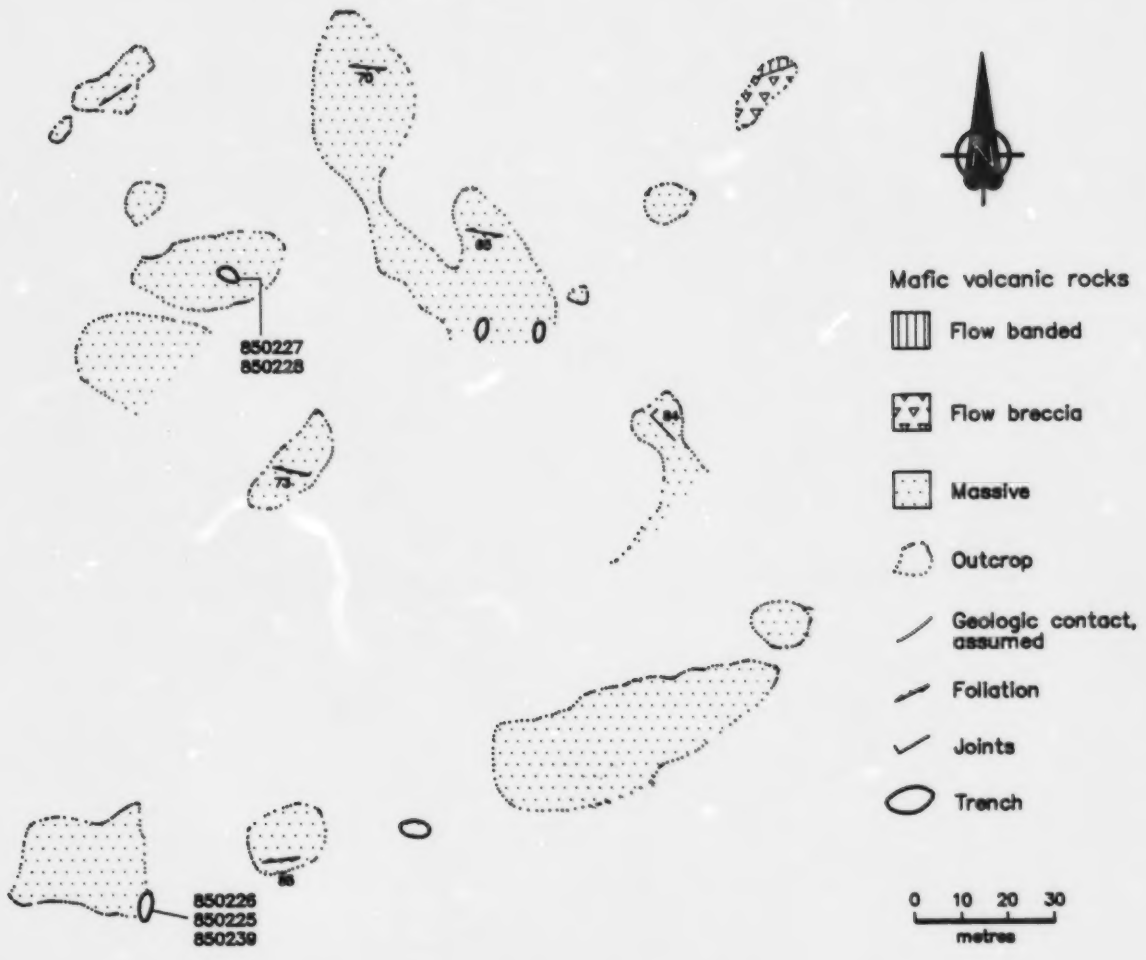


*Figure 6-2: Outcrop distribution, geology, trench and sample locations at occurrence 6*

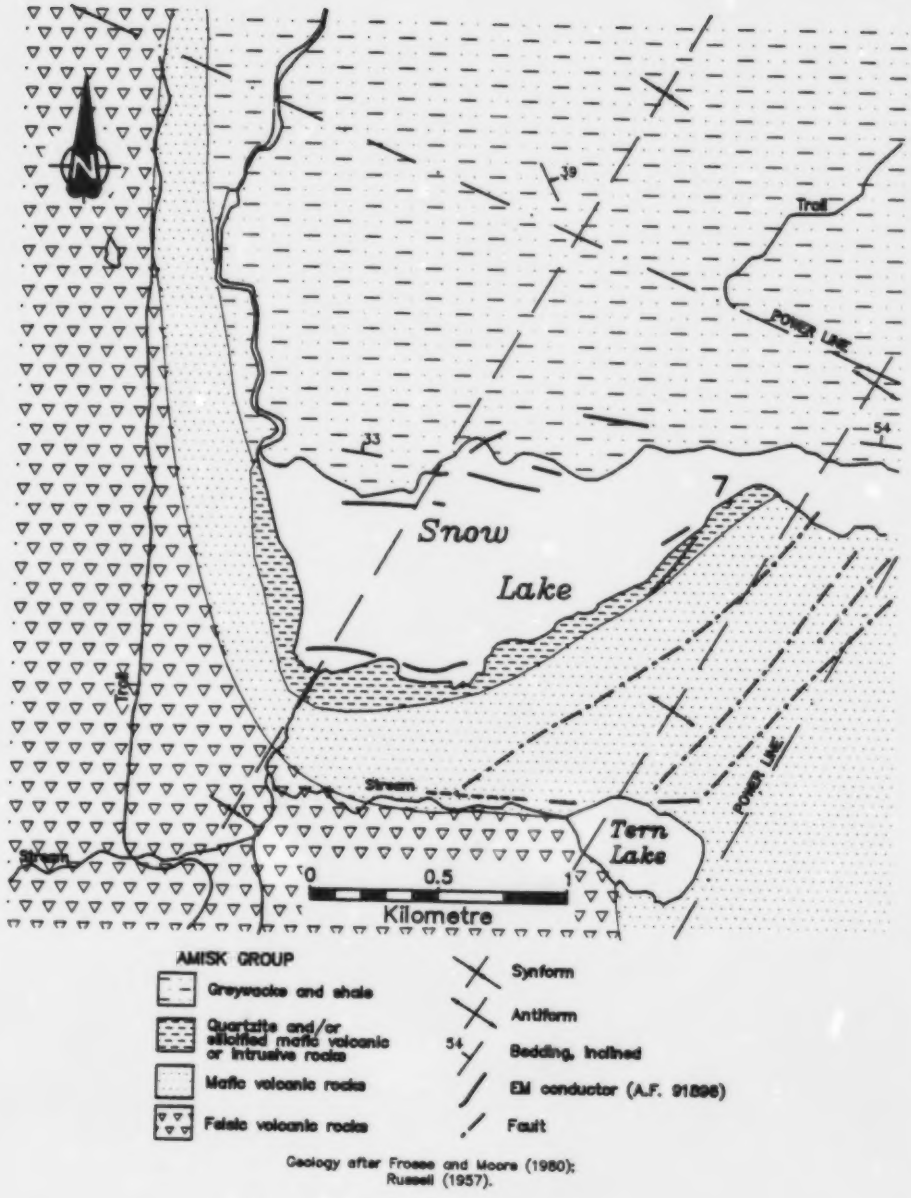


*Figure 7-1: Geological setting of occurrence 7*

**LOCATION: 7**

NAME: WEST SNOW LAKE
UTM: 6082962N/430602E
ACCESS: Snow Lake.

AREA: South shore of Snow Lake.
AIRPHOTO: A26366-192

EXPLORATION SUMMARY:

A ground electromagnetic survey was conducted in this area by Ryanor Mining Company Limited in 1972 (A.F. 91896). The occurrence is presently (1988) covered by C.B. 5793, held by HBED since 1976.

GEOLOGICAL SETTING:

The general area of occurrence 7 is underlain by quartzite, flanked to the north by greywacke and shale and to the south by mafic and felsic volcanic rocks (Fig. 7-1). These rock units have been assigned to the Amisk Group. The occurrence is hosted by fine grained, locally silicified, rusty weathered mafic volcanic rocks characterized by well developed foliation. Fine grained, saccharoidal, siliceous sedimentary rocks and medium grained garnetiferous gabbro were observed in the vicinity of the occurrence.

MINERALIZATION:

Disseminated, up to 5%, pyrite and pyrrhotite occur in white quartz veins and adjacent to the quartz veins in the mafic volcanic wall rock. The quartz veins are developed in strongly foliated mafic volcanic rocks.

GEOCHEMICAL DATA:

Two samples of pyrite-bearing quartz from a partly caved pit in a rock face along the southern lakeshore were collected for analysis (Fig. 7-2); data are presented in Appendix I. One of the samples contained 150 ppb Au, 525 ppm Zn, 97 ppm Cu and 2.8 ppm Ag.

CLASSIFICATION:

Vein-type deposit. Sulphide-bearing quartz veins associated with strongly foliated mafic volcanic rocks.

REFERENCES:


Assessment File 91896
Manitoba Energy and Mines, Minerals Division.

Froese, E. and Moore, J.M.
1980: Metamorphism in the Snow Lake area, Manitoba; Geological Survey of Canada, Paper 78-27, 16 p.

Gonzales, A. and Fedikow, M.A.F.
1984: Mineral deposit studies, Snow Lake area; in Manitoba Energy and Mines, Report of Field Activities 1984, p. 46-52.

Russell, G.A.
1957: Structural studies of the Snow Lake-Herb Lake area; Manitoba Mines Branch, Publication 55-3, 33 p.

*Figure 7-2: Outcrop distribution, geology, trench and sample locations at occurrence 7*

**LOCATION: 8**

NAME: PHOTO LAKE
UTM: 6080498N/430181E
ACCESS: Provincial Highway No.395, traverse.

AREA: 1 km south of Tern Lake.
AIRPHOTO: A26366-243

EXPLORATION SUMMARY:

A ground electromagnetic survey was conducted in this area by Ryanor Mining Company Limited in 1972 (A.F. 91896). The occurrence is presently covered by C.B. 5780, held by HBED since 1976.

GEOLOGICAL SETTING:

The general area of occurrence 8 is underlain by felsic volcanic rocks, flanked to the east by mafic volcanic rocks and to the north by greywacke, shale, quartzite and mafic volcanic rocks (Fig. 8-1). These rock units have been assigned to the Amisk Group. In the vicinity of the occurrence, aphanitic massive grey basalt containing nonmineralized white quartz veins is common. The host rocks to the occurrence are medium grained, rusty weathered mafic intrusive rocks (Fig. 8-2).

MINERALIZATION:

A 0.5 m thick quartz vein that contains 2-3% iron sulphides was observed in a single trench at the occurrence. The host rocks and muck from the trench were rusty weathered but without visible sulphide mineralization. Harrison (1949) describes a 1m thick quartz plug containing rare to minor pyrite, chalcopyrite, galena and possibly tennantite at this occurrence.

GEOCHEMICAL DATA:

One sample (850244) was collected from the pit for assay and contained 178 ppm Cu, 10 ppm Zn, 10 ppb Au and 0.1 ppm Ag (Appendix I). Early reports claim that previous sampling yielded "good assays in gold" (Harrison, 1949).

CLASSIFICATION:

Quartz vein-type deposit in mafic intrusive rocks.

REFERENCES:


Assessment File 91896
Manitoba Energy and Mines, Minerals Division.

Froese, E. and Moore, J.M.
1980: Metamorphism in the Snow Lake area, Manitoba; Geological Survey of Canada, Paper 78-27, 16 p.

Gonzales, A. and Fedikow, M.A.F.
1984: Mineral deposit studies, Snow Lake area; in Manitoba Energy and Mines, Report of Field Activities 1984, p. 46-52.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping Lakes area, Manitoba; Geological Survey of Canada, Memoir 250, p. 74.

Russell, G.A.
1957: Structural studies of the Snow Lake-Herb Lake area; Manitoba Mines Branch, Publication 55-3, 33 p.

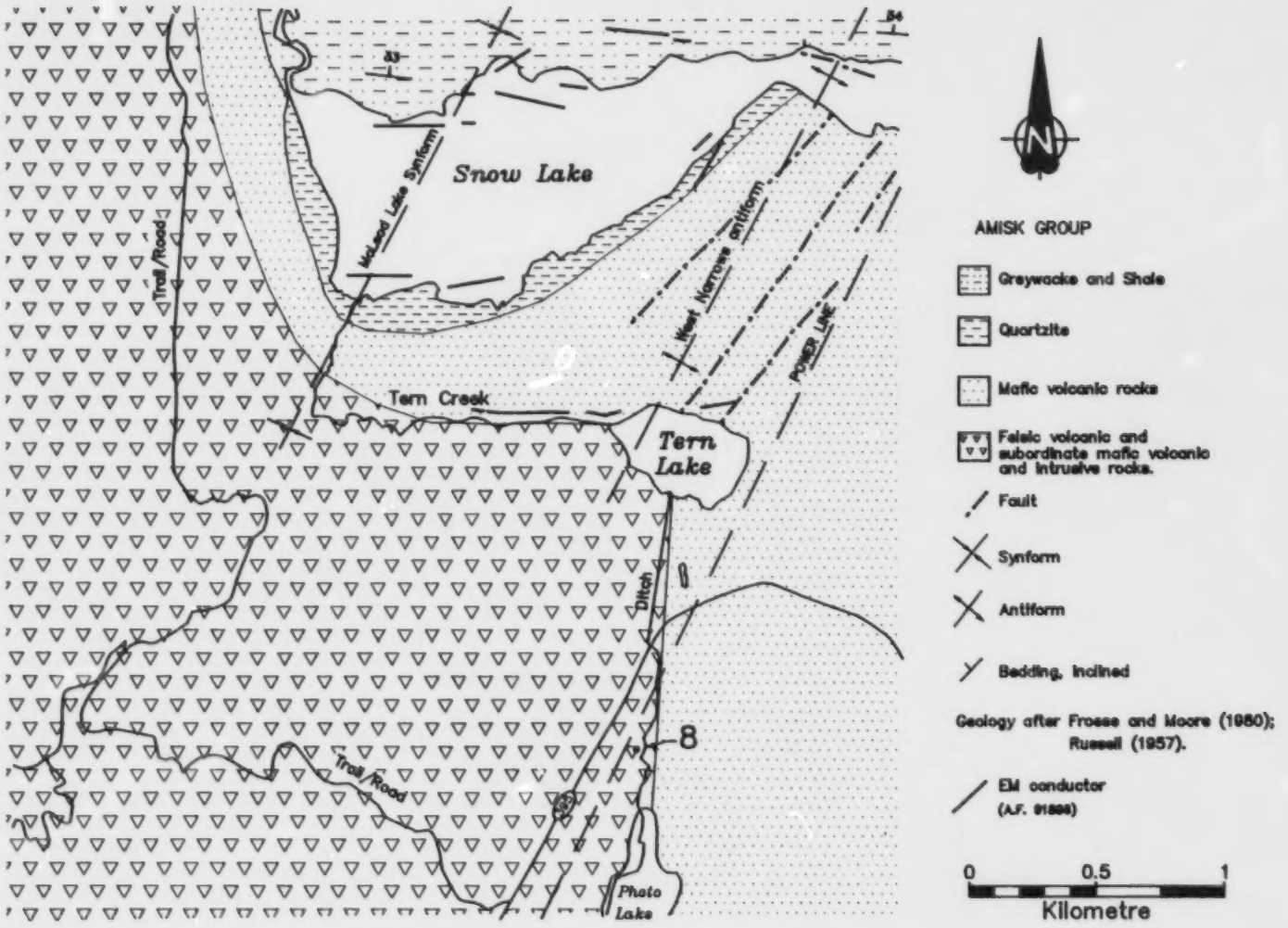


*Figure 8-1: Geological setting of occurrence 8*

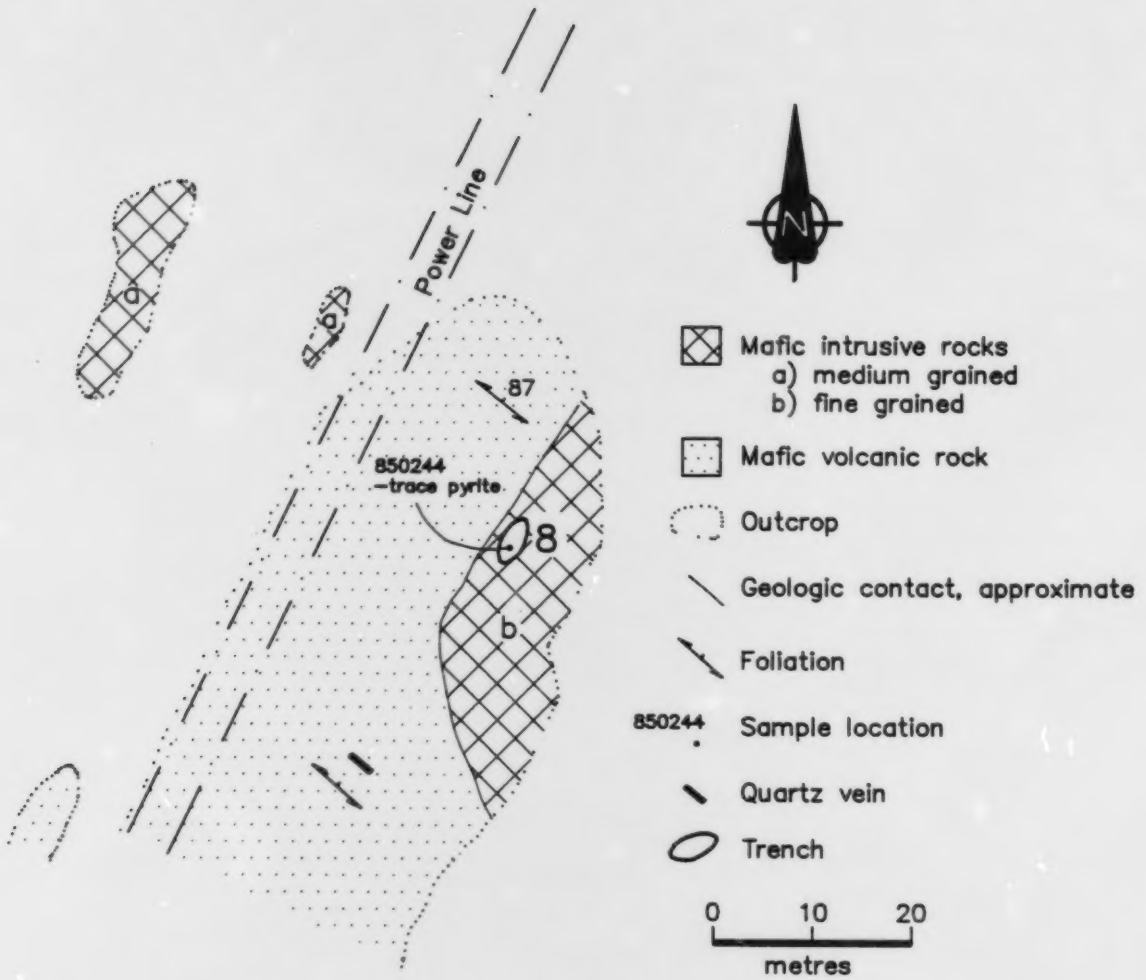


*Figure 8-2: Outcrop distribution, geology, trench and sample locations at occurrence 8*

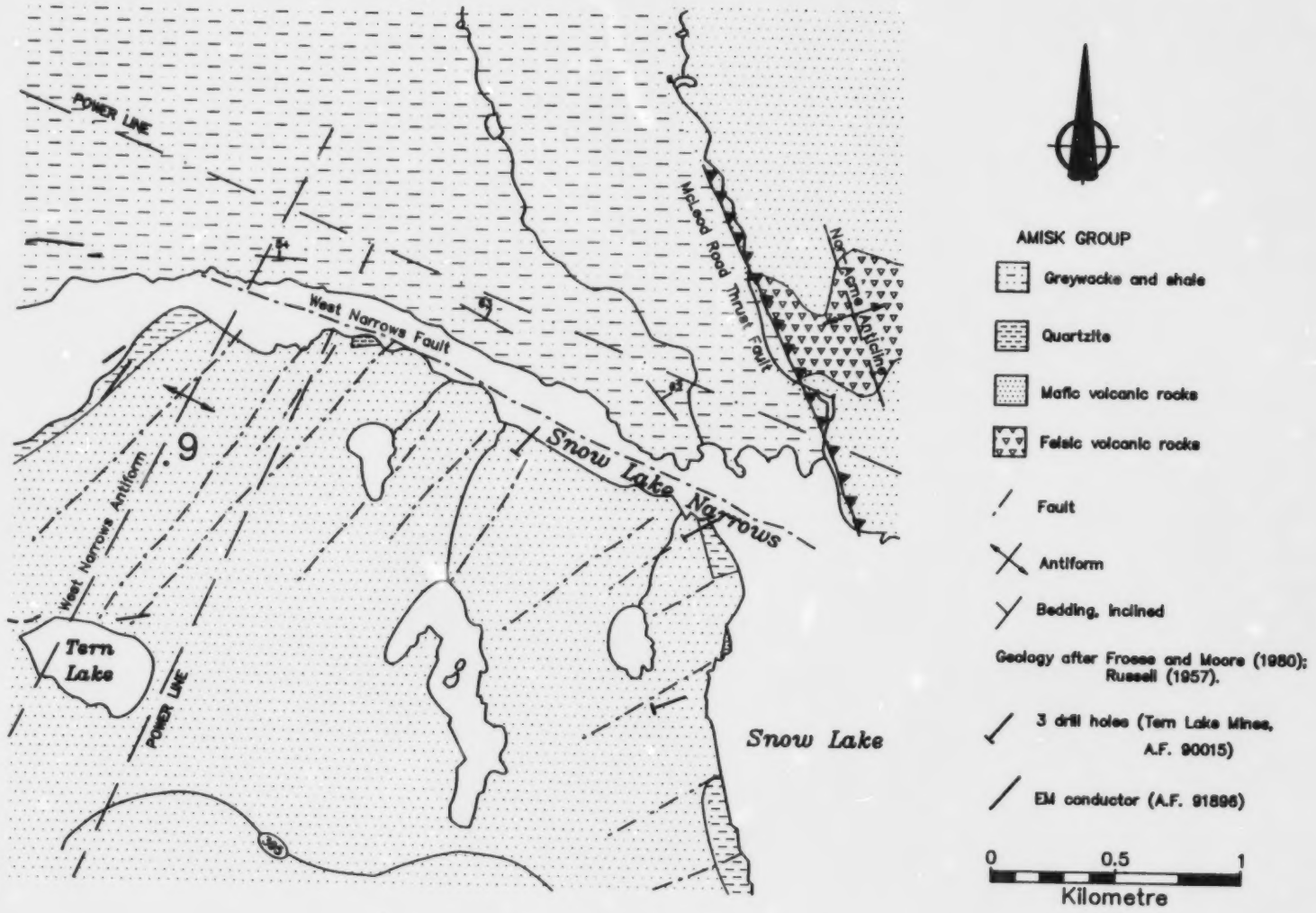


*Figure 9-1: Geological setting of occurrence 9*

**LOCATION: 9**

NAME:

UTM: 6082482N/430659E

ACCESS: Traverse from the west end of Snow Lake Narrows.

AREA: 600 m south of the west end of Snow Lake Narrows.

AIRPHOTO: A26366-192

EXPLORATION SUMMARY:

A ground electromagnetic survey was conducted in this area by Ryanor Mining Company Limited in 1972 (A.F. 91896). The occurrence is presently (1988) covered by C.B. 5793, held by HBED since 1976.

GEOLOGICAL SETTING:

The general area of occurrence 9 is underlain by mafic volcanic rocks, flanked to the north by greywacke, shale, quartzite and felsic volcanic rocks (Fig. 9-1). These rock units have been assigned to the Amisk Group. The axial trace of the West Narrows Antiform has been mapped in the vicinity of the occurrence. Fine grained mafic volcanic rocks are the dominant lithology in the area. The occurrence, however, is hosted by medium grained mafic intrusive rocks (Fig. 9-2).

MINERALIZATION:

Two overgrown and caved trenches 110 m apart contain disseminated (3-4%) sulphides in rusty weathered mafic intrusive rocks. Minor quartz veins accompany the intrusive rocks in these areas. The western trench contains pyrite; arsenopyrite occurs in the eastern trench.

GEOCHEMICAL DATA:

One rock sample collected for analysis contained 152 ppm Cu, 32 ppm Zn, 27 ppb Au, and 0.2 ppm Ag (Appendix I).

CLASSIFICATION:

Disseminated mineralization - not classified. Sulphide-bearing mafic intrusive rock.

REFERENCES:


Assessment File 90015, 91896
Manitoba Energy and Mines, Minerals Division.

Froese, E. and Moore, J.M.
1980: Metamorphism in the Snow Lake area, Manitoba; Geological Survey of Canada, Paper 78-27, 16 p.

Gonzales, A. and Fedikow, M.A.F.
1984: Mineral deposit studies, Snow Lake area; in Manitoba Energy and Mines, Report of Field Activities 1984, p. 46-52.

Russell, G.A.
1957: Structural studies of the Snow Lake-Herb Lake area; Manitoba Mines Branch, Publication 55-3, 33 p.

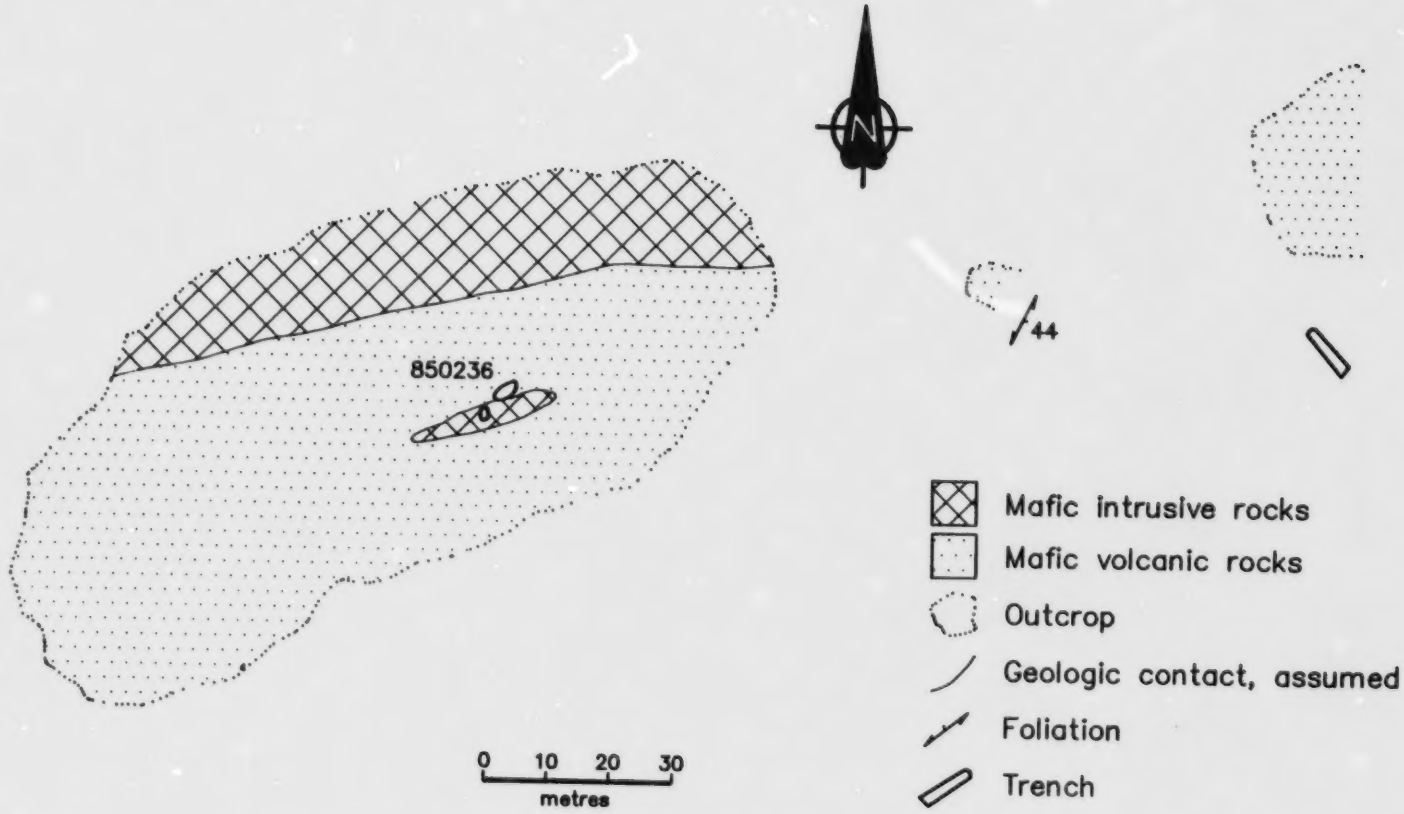


*Figure 9-2: Outcrop distribution, geology, trench and sample locations at occurrence 9*

**LOCATION: 10**

NAME: SNOW LAKE NARROWS (Galena 'showing')
UTM: 6082571N/432131E
ACCESS: Snow Lake.

AREA: South side of Snow Lake Narrows.
AIRPHOTO: A26366-244

EXPLORATION SUMMARY:

Carl Stoltz, Louis Stoltz and Peter Durand recorded the S.D. claims group over occurrence 10 in 1943. In 1945 Camwe Snow Lake Mines Limited undertook a detailed examination of the area including prospecting, sampling, geological mapping and 2935 m of diamond drilling (A.F. 90198). The claims were transferred to Tern Lake Mines Limited in 1948 who completed three diamond drill holes (A.F. 90015). In 1971 the claims were restaked on behalf of W. Bruce Dunlop Limited who transferred them to Ruttan Lake Explorations Limited; the claims were cancelled in 1974. HBED, the current owners, staked CB 5792 in 1976 and have conducted ground magnetometer surveys, electromagnetic surveys and diamond drilling on the claim (Mineral Inventory Card 63K/16NE Au7).

GEOLOGICAL SETTING:

The general area of occurrence 10 is underlain by mafic volcanic rocks. The mafic volcanic rocks are flanked to the north by greywacke, shale and felsic volcanic rocks (Fig. 10-1). These rock units have been assigned to the Amisk Group. Numerous shear zones representing splays from the West Narrows Fault occur in the area and are accompanied by carbonatization, silicification and amphibolization. At the occurrence the host rocks are fine grained, strongly foliated, locally silicified garnetiferous mafic volcanic flows and volcanic breccia (Fig. 10-2).

MINERALIZATION:

Quartz veinlets and stringers with pyrite and Fe-carbonate are exposed in a vertical rock face along the southern shore of the Snow Lake Narrows. A northeast-trending quartz vein with a steep northwesterly dip and a maximum exposed width of 0.6 m can be traced along strike for 20 m. It is accompanied by disseminated (maximum 10%) pyrite, sphalerite, galena, chalcopyrite, and tennantite. Pyrite and pyrrhotite occur in the wall rock. Mineralization intersected in diamond drill holes collared southeast of the showing is characterized by sulphide streaks within faulted argillite (A.F. 90015).

GEOCHEMICAL DATA:

Four rock samples were collected for analysis. One sample contained 3290 ppb Au and 1197 ppm As. Cu values ranged from 137 to 201 ppm. Zn values were low. Data are presented in Appendix I.

Sampling by Camwe Snow Lake Mines Ltd. in 1945 yielded a maximum of 1.0 g/t Au and 629 g/t Ag over 0.33 m (A.F. 90198).

CLASSIFICATION:

Vein-type deposit. Sulphide-bearing quartz veins within zones of strongly foliated mafic volcanic rocks.

REFERENCES:


Alcock, F.J.
1920: The Reed-Wekusko map-area, northern Manitoba; Geological Survey of Canada Memoir 119, p. 38.

Assessment File 90015, 90198
Manitoba Energy and Mines, Minerals Division.

Froese, E. and Moore, J.M.
1980: Metamorphism in the Snow Lake area, Manitoba; Geological Survey of Canada, Paper 78-27, 16 p.

Gonzales, A. and Fedikow, M.A.F.
1984: Mineral deposit studies, Snow Lake area; in Manitoba Energy and Mines, Report of Field Activities 1984, p. 46-52.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping Lakes area, Manitoba; Geological Survey of Canada, Memoir 250, p. 74-75.

Mineral Inventory Card 63K/16NE Au7
Manitoba Energy and Mines, Minerals Division.

Russell, G.A.
1957: Structural studies of the Snow Lake-Herb Lake area; Manitoba Mines Branch, Publication 55-3, 33 p.

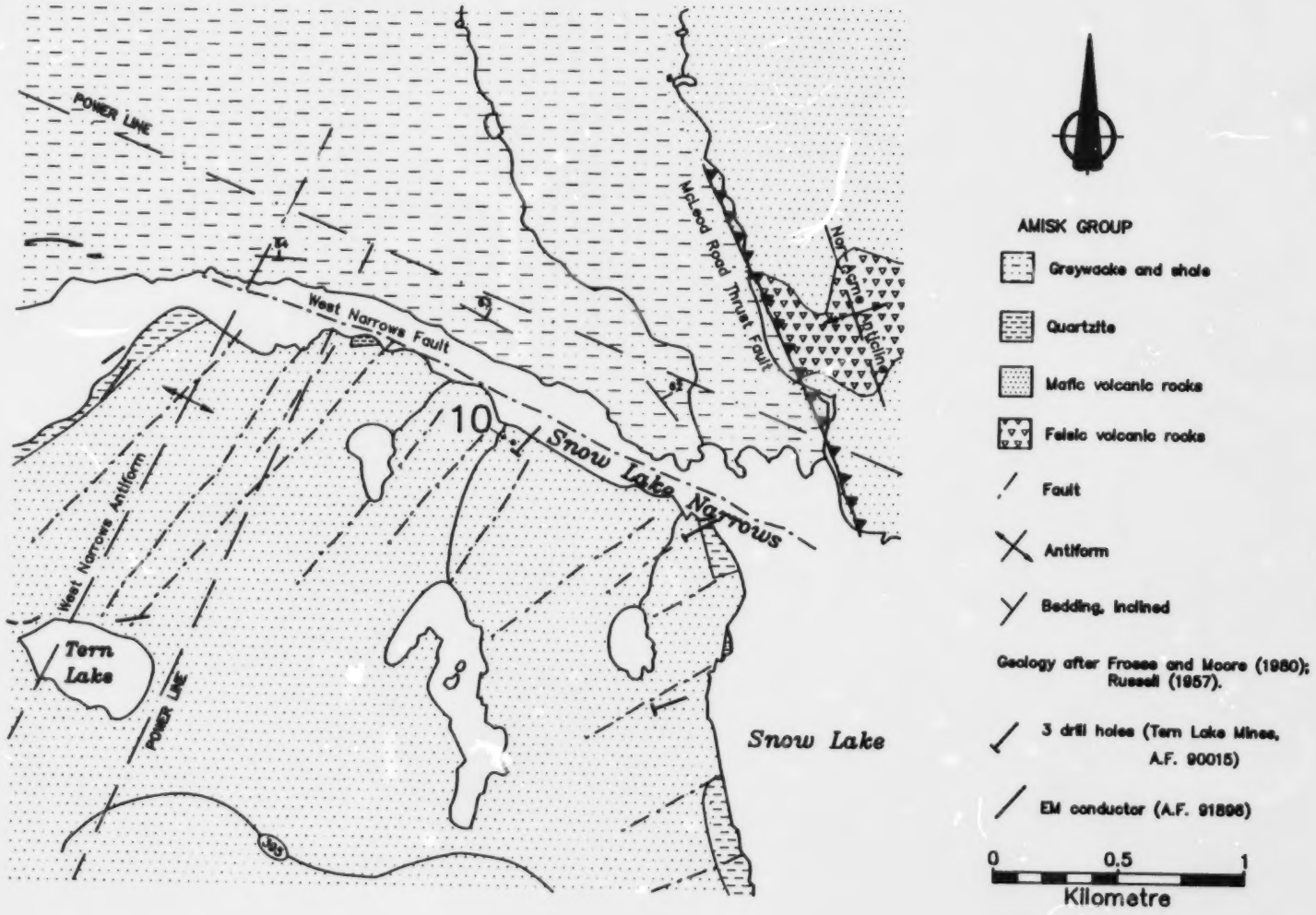


*Figure 10-1: Geological setting of occurrence 10*

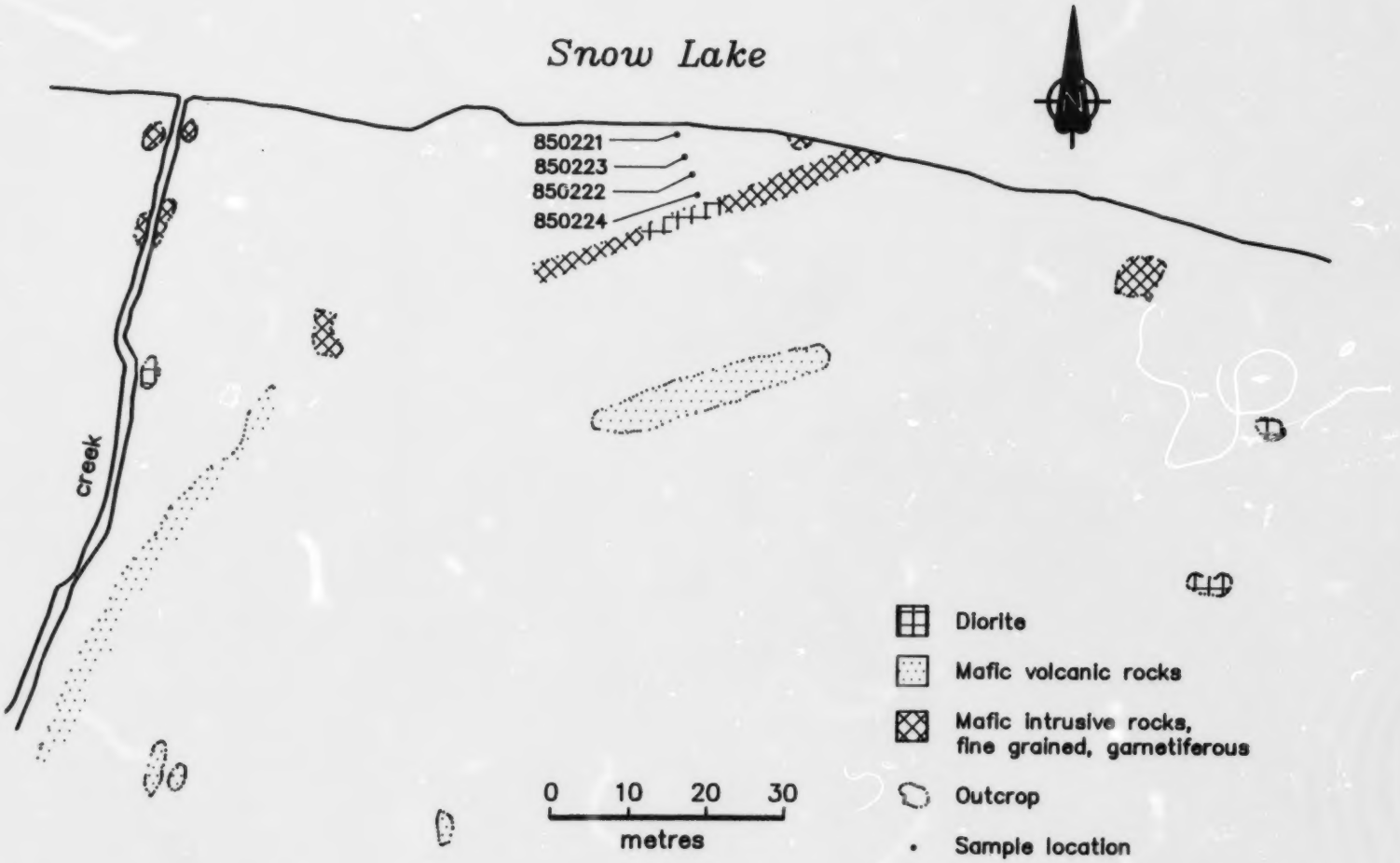


*Figure 10-2: Outcrop distribution, geology and sample locations at occurrence 10.*

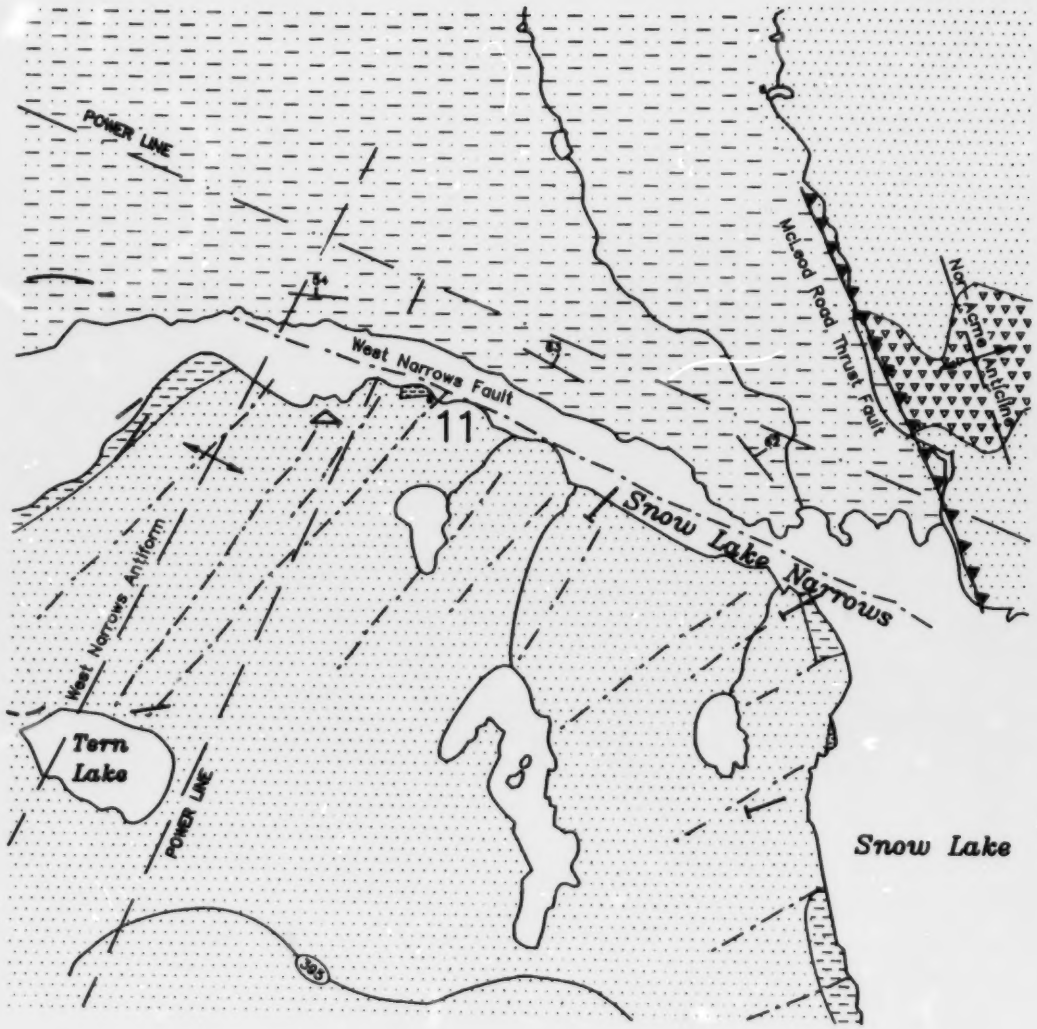


*Figure 11-1: Geological setting of occurrence 11.*

**LOCATION:** 11

NAME: SNOW LAKE NARROWS
UTM: 6082929N/431496E
ACCESS: Snow Lake

AREA: South shore of Snow Lake Narrows
AIRPHOTO: A26366-244

EXPLORATION SUMMARY:

The area around occurrence 11 was first staked in 1943 by Peter Durand; interests in the property were transferred in 1945 to Camwe Snow Lake Mines Limited, who conducted a detailed property examination including prospecting, mapping, sampling and diamond drilling (A.F. 90198). Tern Lake Mines Limited gained all interests in the property in 1948 and completed four diamond drill holes (A.F. 90205). HBED, the current (1988) owners, staked CB 5792 in 1976.

GEOLOGICAL SETTING:

The general area of occurrence 11 is underlain by mafic volcanic rocks. The occurrence is situated close to the West Narrows Fault and astride a northeasterly trending fault that appears to splay from the West Narrows Fault. The occurrence is flanked to the north by greywacke and shale (Fig. 11-1). The mafic volcanic rocks, greywacke and shale have been assigned to the Amisk Group. The occurrence is hosted by a carbonatized and silicified medium grained gabbro.

MINERALIZATION:

Location 11 encompasses four occurrences mapped by Camwe Snow Lake Mines Ltd.: Occurrences C, D, E and the Durand occurrence (A.F. 90198) (Fig. 11-2). Occurrence C includes three trenches that expose disseminated arsenopyrite and ribbon-like quartz fracture fillings in a 30 m long zone up to 7.5 m wide (op. cit.). Occurrence D is represented by pyrite- and pyrrhotite-bearing quartz stringers (op. cit.) in a 3-6 m shear. Occurrence E, at the lakeshore, is a quartz-carbonate "band" with minor pyrite and trace galena in a shear zone (op. cit.). Rusty weathering gabbro at the Durand occurrence contains fine grained disseminated pyrite, pyrrhotite and arsenopyrite (op. cit.). Less than 10% sulphides were observed at these occurrences.

GEOCHEMICAL DATA:

Samples taken from the four occurrences yielded results that include:

1. Occurrence C - up to 2.1 g/t Au in a grab sample (A.F. 91896);

2. Occurrence D - up to 1.0 g/t Au over 3.0 m (op. cit.);

3. Occurrence E - up to 0.3 g/t Au and 4.1 g/t Ag over 0.76 m (op cit.);

4. Durand Occurrence - up to 0.1 g/t Au over 2.4 and 2.7 m (op. cit.).

Assays from diamond drilling conducted by Tern Lake Mines Ltd. at 'C' include a 4.6 m section averaging 4.5 g/t Au in DDH T.L. 1 (Fig. 11-2). Two rock chip samples collected from the area around the Durand occurrence (Fig. 11-3) contained 4250 and 164 ppb Au and a maximum of 1356 ppm As and 186 ppm Cu (Appendix I).

CLASSIFICATION:

Vein-type deposit. Auriferous sulphide-bearing quartz veins accompanying local shear zones in mafic intrusive rocks.

REFERENCES:


Assessment Files 90015, 90205, 90198
Manitoba Energy and Mines, Minerals Division.

Froese, E. and Moore, J.M.
1980: Metamorphism in the Snow Lake area, Manitoba; Geological Survey of Canada, Paper 78-27, 16 p.

Gonzales, A. and Fedikow, M.A.F.
1984: Mineral deposit studies, Snow Lake area; in Manitoba Energy and Mines, Report of Field Activities 1984, p. 46-52.

Mineral Inventory Card 63K/16NE Au7
Manitoba Energy and Mines, Minerals Division.

Russell, G.A.
1957: Structural Studies of the Snow Lake-Herb Lake area; Manitoba Department of Mines and Natural Resources, Mines Branch, Publication 55-3, 33 p.

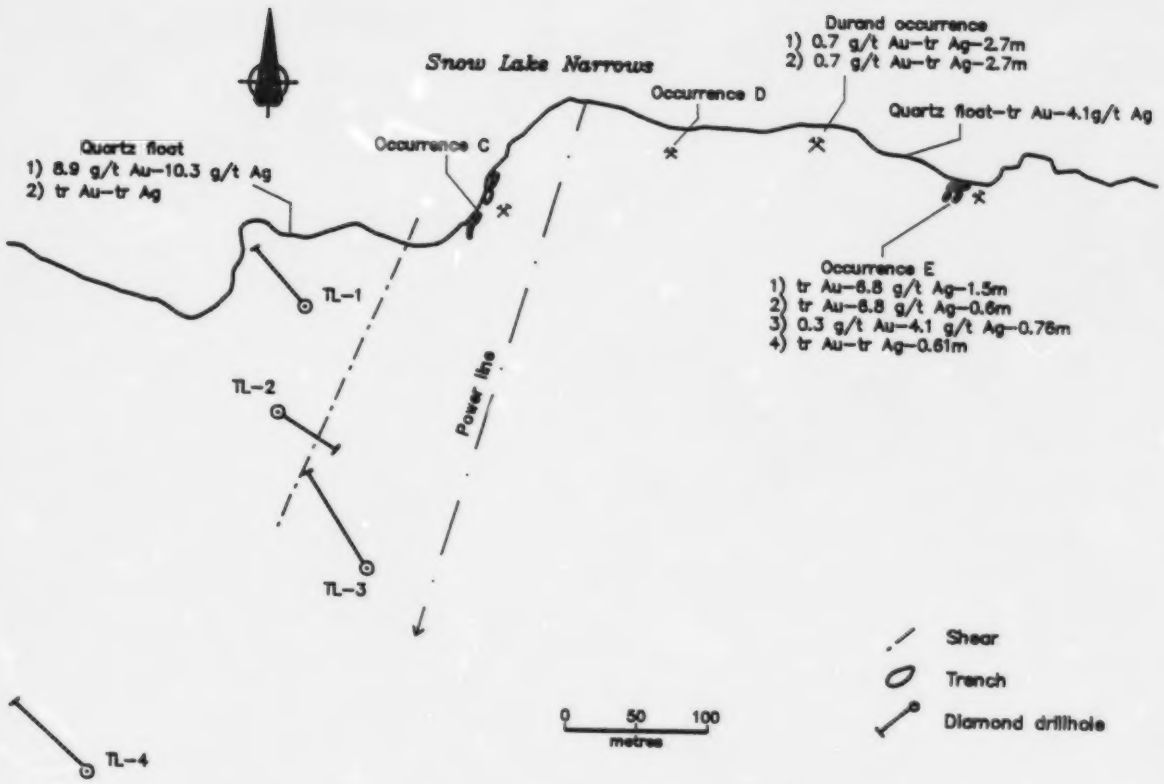


*Figure 11-2: Location of occurrences, diamond drill holes and assay results at occurrence 11*

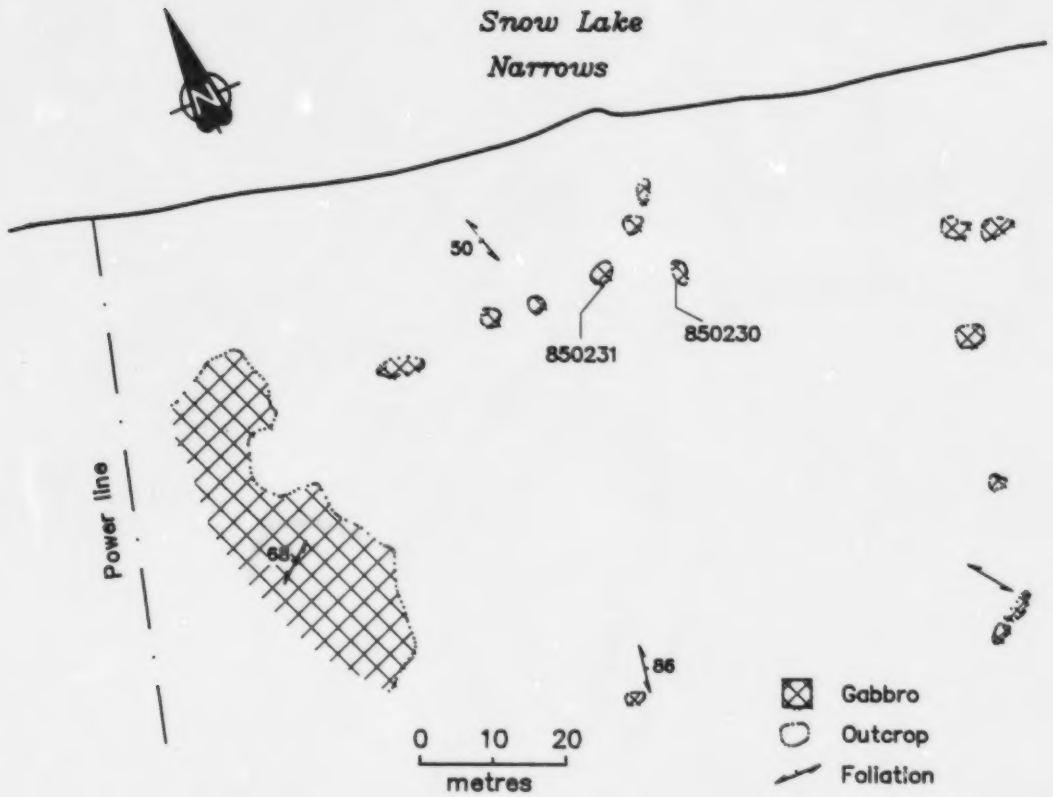


*Figure 11-3: Outcrop distribution, geology, trench and sample locations at occurrence 11*

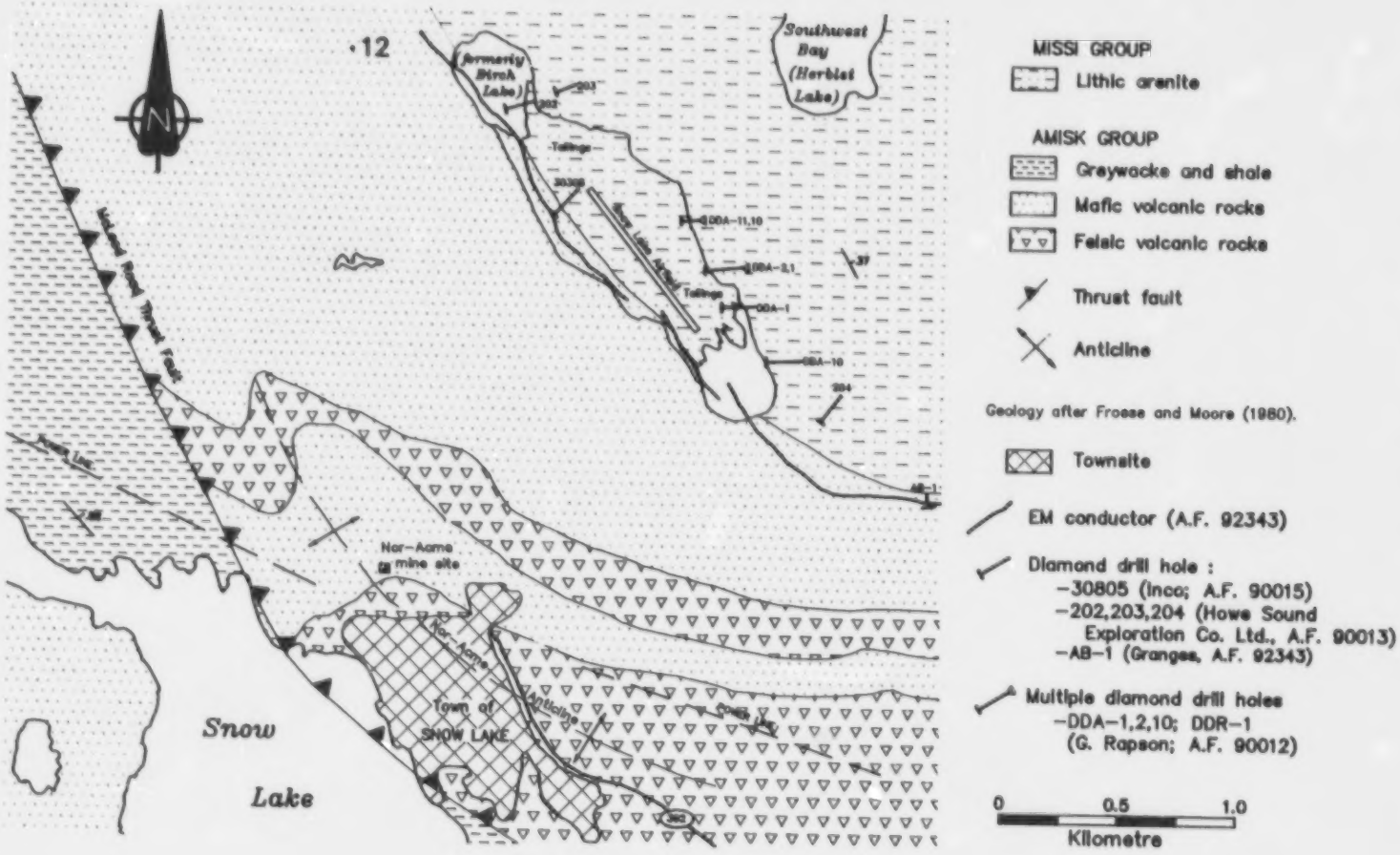


*Figure 12-1: Geological setting of occurrence 12*

**LOCATION:** 12

NAME: SNOW LAKE MINES SNOW GROUP
UTM: 6084496N/434019E
ACCESS: Traverse from the Nor-Acme minesite.

AREA: 450 m west of Birch Lake
AIRPHOTO: A26366-201

EXPLORATION SUMMARY:

Occurrence 12 was first covered by the Dick 16 claim, staked in 1942 by C.R. Parres for Nor-Acme Gold Mines Limited. Lease M-1261 was issued to Nor-Acme in 1943. Nor-Acme subsequently subleased the property to Howe Sound Exploration Company Limited. The lease was cancelled in 1964. In 1964 John McNevin staked claim Nov 1 and assigned it to Canadian Nickel Company Limited. A magnetometer survey was undertaken in 1965 by Canadian Nickel Co. Ltd. The claim was cancelled in 1970. The area was restaked in 1971 by W. Bruce Dunlop Limited. Subsequent work includes linecutting, VLF-EM surveys, and diamond drilling by Gold Fields Canadian Mining Limited and further diamond drilling by H.B.M.S. The property is currently under option to Snow Lake Mines, who have conducted diamond drilling since 1987.

GEOLOGICAL SETTING:

The general area of occurrence 12 is underlain by mafic volcanic rocks in an area flanked to the east by Missi Group greywacke and to the west by Amisk Group greywacke and shale. The western contact of the mafic volcanic rocks and the greywacke and shale is marked by the McLeod Road Thrust Fault (Fig. 12-1). The occurrence is hosted by mafic volcanic rocks, locally biotite- and amphibole-rich, and fine- to medium-grained gabbro.

MINERALIZATION:

Rusty weathered mafic volcanic rocks and fine- to medium-grained gabbro were observed in muck adjacent to two slumped trenches (Fig. 12-2). Less than 1% mineralization was observed.

GEOCHEMICAL DATA:

One sample taken from muck near the trenches contained 82 ppm Cu, 14 ppm Zn, 2 ppb Au, 0.1 ppm Ag and 2 ppm Pb (Appendix I).

CLASSIFICATION:

Disseminated mineralization - not classified.

REFERENCES:

Froese, E. and Moore, J.M.
1980: Metamorphism in the Snow Lake area, Manitoba; Geological Survey of Canada, Paper 78-27, 16 p.

Gonzales, A. and Fedikow, M.A.F.
1984: Mineral deposit studies, Snow Lake area; in Manitoba Energy and Mines, Report of Field Activities 1984, p. 46-52.

Mineral Inventory Card 63K/16NE Au16, 17, 19
Manitoba Energy and Mines, Minerals Division.

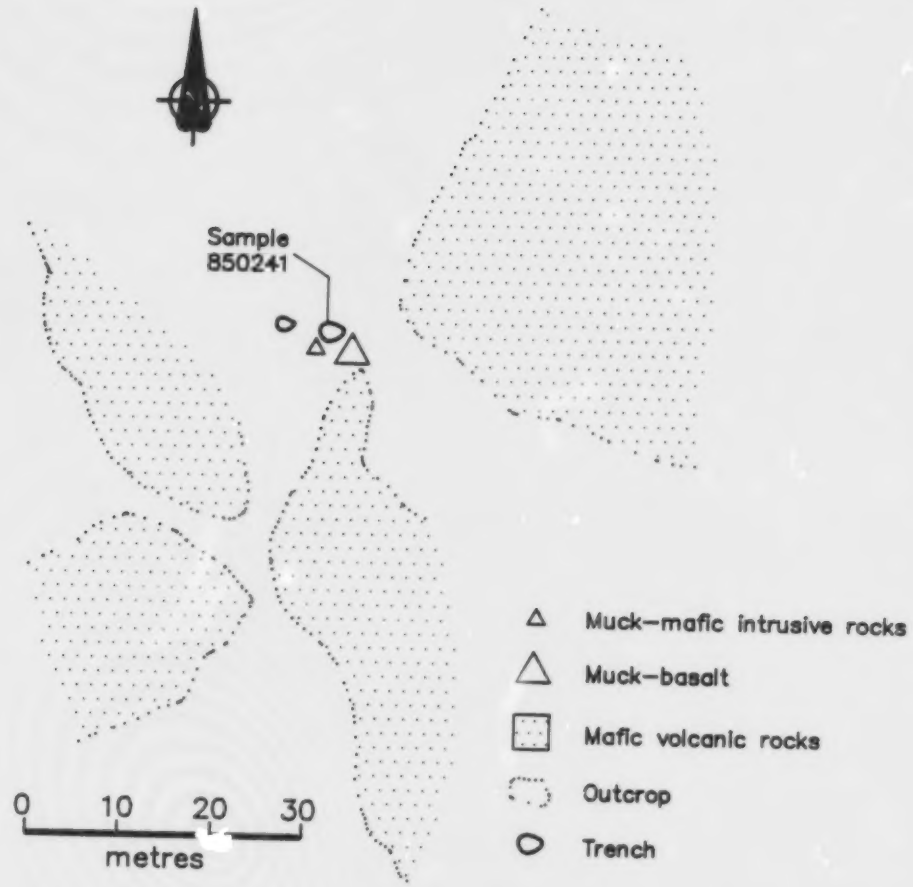


*Figure 12-2: Outcrop distribution, geology, trench and sample locations at occurrence 12*

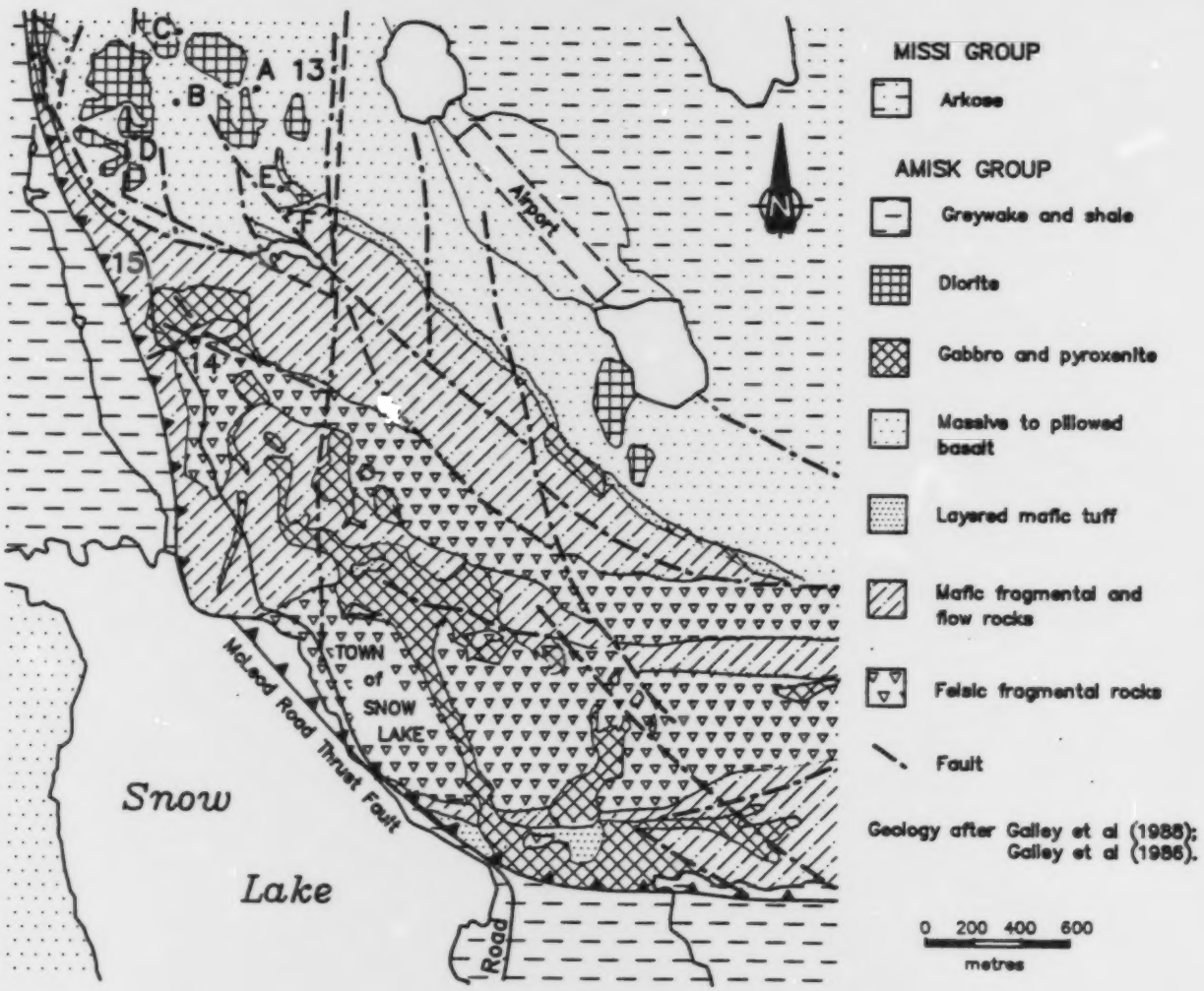


*Figure 13-1: Geological setting of occurrences 13(A-F), 14 and 15*

**LOCATION:** 13

NAME: SNOW LAKE MINES PROPERTY / GOLDFIELDS PROPERTY

UTM: 6084322N/433838E

ACCESS: Gravel road from Snow Lake.

AREA: 1.4 km north of the town of Snow Lake

AIRPHOTO: A26366-201

EXPLORATION SUMMARY:

In 1942 C.R. Parres recorded claim Dick 16 over occurrence 13 and transferred its ownership to Nor-Acme Gold Mines Limited. Nor-Acme leased the ground (Lease M-1261) in 1943 and subleased it to Howe Sound Exploration Company Limited in 1943. The lease was cancelled in 1964. J. McNevin recorded Nov 1 in 1964, and in 1965 assigned it to Canadian Nickel Company Limited who performed a magnetometer survey on the ground. The claim was cancelled in 1970. W. Bruce Dunlop Limited (NPL) staked CB 3881 in 1971. Granges Exploration Aktiebolag optioned the claim in 1980-81 and conducted linecutting and an electromagnetic survey. The property was transferred to Darius Gold Mine Incorporated in 1982, and later that year, to Gold Fields Canadian Mining Limited who carried out linecutting, a VLF-EM survey and diamond drilling. HBM&S diamond drilled 3406 m under option in 1985-86 (Mineral Inventory Card 63K/16 Au 16, 17, 19). In 1986 Silver Hart Mines Limited, and later that year, Snow Lake Mines Limited acquired the property under an agreement with W. Bruce Dunlop Ltd. Diamond drilling was conducted in 1987-88 (Mineral Inventory Card 63K/16 Au 16, 17, 19).

GEOLOGICAL SETTING:

The general area of occurrence 13 is underlain by northwest-striking northeast-dipping mafic volcanic rocks. The northern part of the property is dominantly underlain by massive to pillowed mafic flows, and the southern part by mafic heterolithic fragmental rocks (Fig. 13-1, 13-2). The southernmost part of the property is underlain by felsic tuff and lapilli-tuff. Mafic intrusions are common. All supracrustal rocks have been assigned to the Amisk Group. Numerous faults marked by 1-2 m wide schistose zones occur in the area and have been interpreted to splay from the McLeod Road Thrust Fault. These faults are typically curvilinear and strike from 080° to 285°. Geological characteristics of each of the six mineralized sites described under occurrence 13 are provided below.

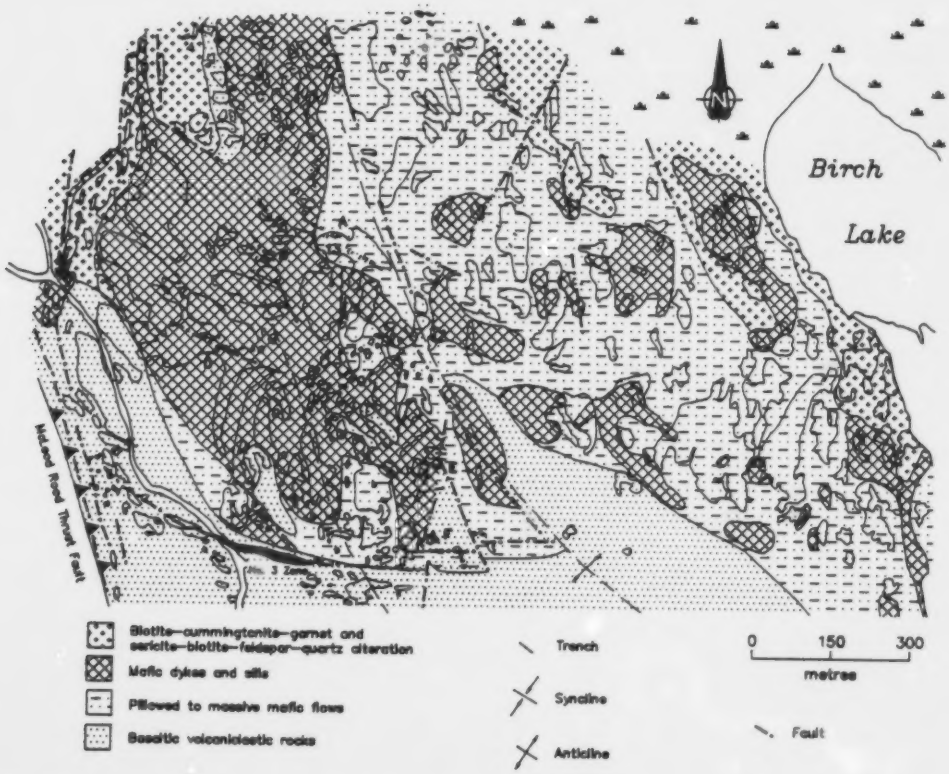


*Figure 13-2: Detailed geology of occurrence 13 (after Galley et al., 1988). Sites A to F are named as per Fig. 13-1.*

SHERRY ZONE (SITE A; Fig. 13-3)

GEOLOGICAL SETTING:

The Sherry Zone is hosted by Amisk Group massive to pillowed basalts which have been intruded by hornblende porphyroblastic gabbro. These rocks have been folded around northwest-striking fold axes, and then crosscut by numerous shears and faults, some of which contain anomalous concentrations of gold.

MINERALIZATION:

The occurrence consists of a single shear-hosted 20 to 30 cm wide vein that has been exposed by a dozen trenches for 150 m. The vein is a quartz-carbonate-hosted breccia with biotite-carbonate altered fragments of wallrock containing fine grained arsenopyrite. The vein is surrounded by a thin (10 to 20 cm) halo of strongly foliated, biotite-carbonate altered basalt, which may contain fine grained arsenopyrite.

GEOCHEMICAL DATA:

Assay results for six samples collected from this site are presented in Table 13-1. Multi-element geochemical analyses for four of these samples are presented in Appendix I. Au and As contents range from 4 to 1090 ppb and from 64 to 2908 ppm, respectively.

CLASSIFICATION:

Vein-type deposit. Sulphide mineralization occurs in a shear-hosted quartz-carbonate breccia vein.

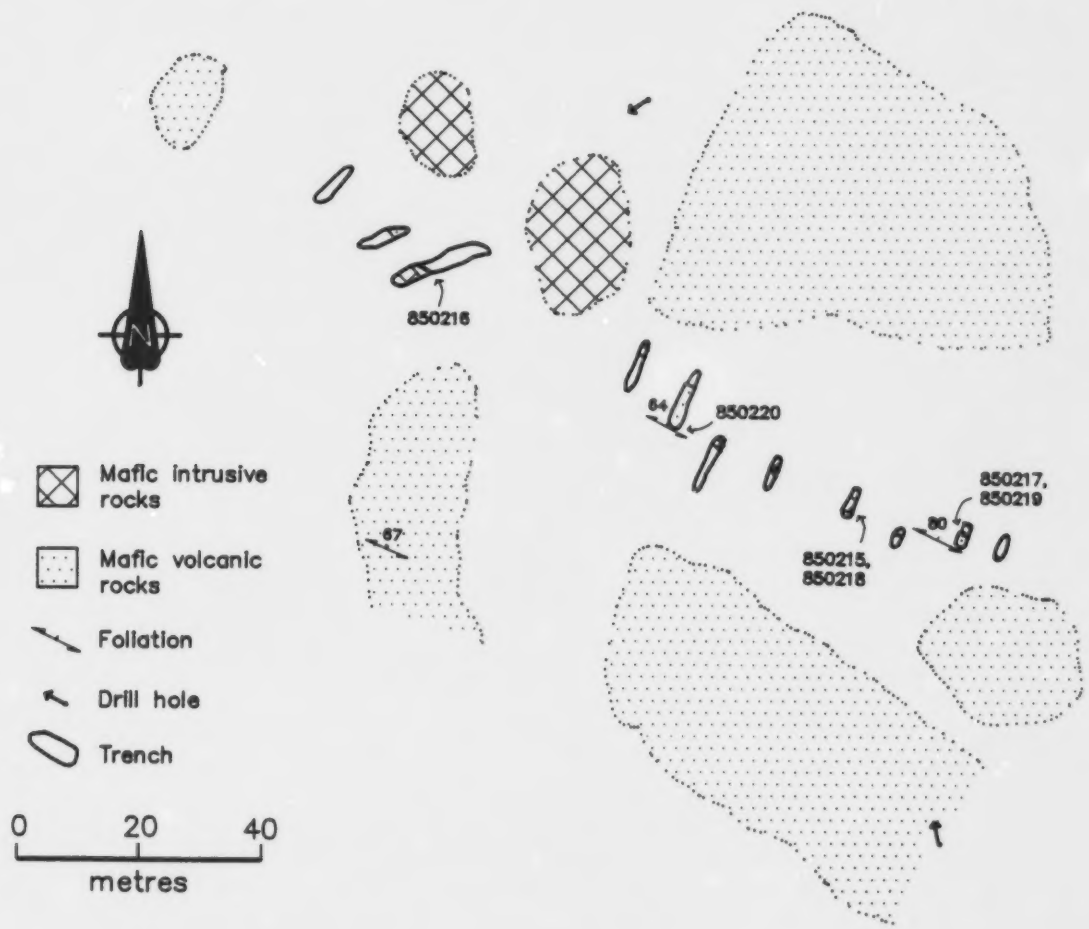


*Figure 13-3: Outcrop distribution, trench and sample locations at the Sherry Zone (Site A), occurrence 13*

NO. 2 VEIN (SITE B; Fig. 13-4)

GEOLOGICAL SETTING:

The No. 2 Vein occurrence is hosted within a medium- to coarse-grained hornblende porphyroblastic gabbro. The gabbro intrudes a sequence of Amisk Group massive to pillowed basalt. The gabbro and basalt are folded about northwest-striking fold axes, and crosscut by a series of shears and faults at 290°, 330°, 350° and 050°.

MINERALIZATION:

The occurrence is a zone of highly altered rock 75 m by 30 m, that has been exposed by a large H-shaped trench and several smaller trenches to the west and north. The alteration is centred on a 330°-striking shear that crosscuts layered gabbro with layering striking 320°. The zone contains a series of carbonate veins striking 340° and 315°, and deformed quartz-carbonate-tourmaline veins at 270° and 300°. The rock is strongly bleached by intense carbonate alteration. Sulphide mineralization (maximum 5%) occurs as disseminated acicular arsenopyrite crystals, veinlets, and grains of pyrrhotite.

GEOCHEMICAL DATA:

Analytical data for five samples are presented in Table 13-2 (assay results) and in Appendix I. Au and As range from 48 to 11350 ppb and from 225 to 8130 ppm, respectively.

CLASSIFICATION:

Replacement-type deposit. Disseminated sulphide mineralization in a bleached, sheared gabbro.

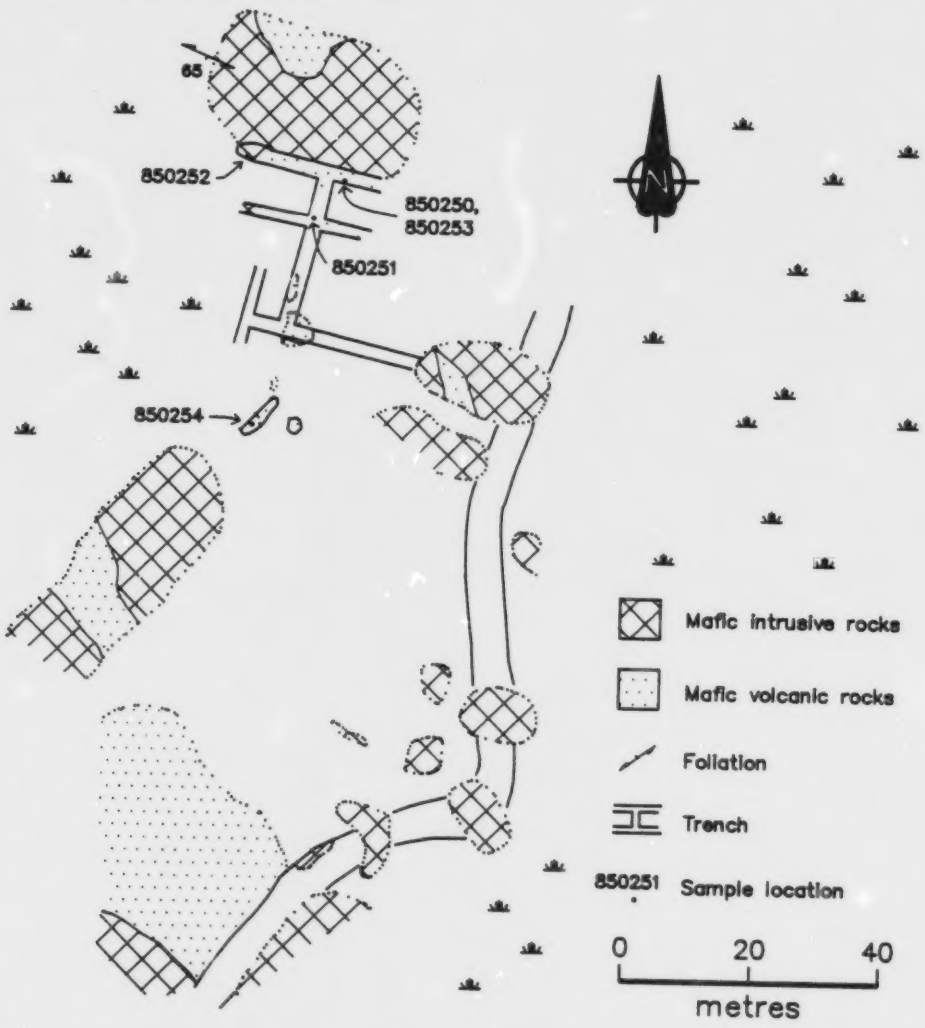


*Figure 13-4: Outcrop distribution, geology, trench and sample locations at No. 2 Zone (Site B), occurrence 13*

## NO. 1 VEIN (SITE C; Fig. 13-5)

### GEOLOGICAL SETTING:

The No. 1 Vein is hosted by Amisk Group medium- to coarse-grained gabbro and fine grained diorite that intrude a sequence of massive to pillowed basalt flows. The zone has been exposed by extensive stripping for over 250 m, and is composed of a quartz-carbonate-albite vein up to 1 m wide, within a zone up to 1.5 m wide of strongly foliated, biotite-carbonate altered mafic intrusion. Within the gabbro, the vein system crudely follows a fine grained diorite dyke.

### MINERALIZATION:

The vein strikes 350°, dipping moderately to the east. Its composition varies from a quartz vein containing coarse grained, black 'wood' tourmaline, to a quartz-carbonate-albite breccia containing angular fragments of altered wallrock impregnated with fine grained, acicular arsenopyrite. There are three of these breccia zones along the vein's exposed length. In the northern half of the occurrence the vein bifurcates; the intersection of the two veins is marked by one of the more extensive vein breccia zones.

In addition to the biotite-carbonate alteration within the shear zone containing the mineralization, alteration also occurs as a 10 to 15 m wide halo of chlorite-carbonate veins that encompasses the vein system. The alteration veins vary from irregular fracture filling to northeast-to east-striking planar fractures.

Within a swamp south of the vein system, fragments of arsenopyrite-rich float have been observed, although they could represent fly-rock from the blasting of old trenches.

There is a smaller, parallel zone of veining and alteration exposed by a pit 70 m to the west, and 100 m to the east is a sheared cliff face that has been exposed by a collapsed trench.

### GEOCHEMICAL DATA:

Table 13-3 summarizes assay data and Appendix I presents multi-element data for five samples collected from the trenches. The samples contain a range of 43 to 1990 ppb Au and 254 to 27659 ppm As.

### CLASSIFICATION:

Vein-type deposit. Disseminated sulphide mineralization occurs in a shear-hosted quartz-carbonate breccia vein.

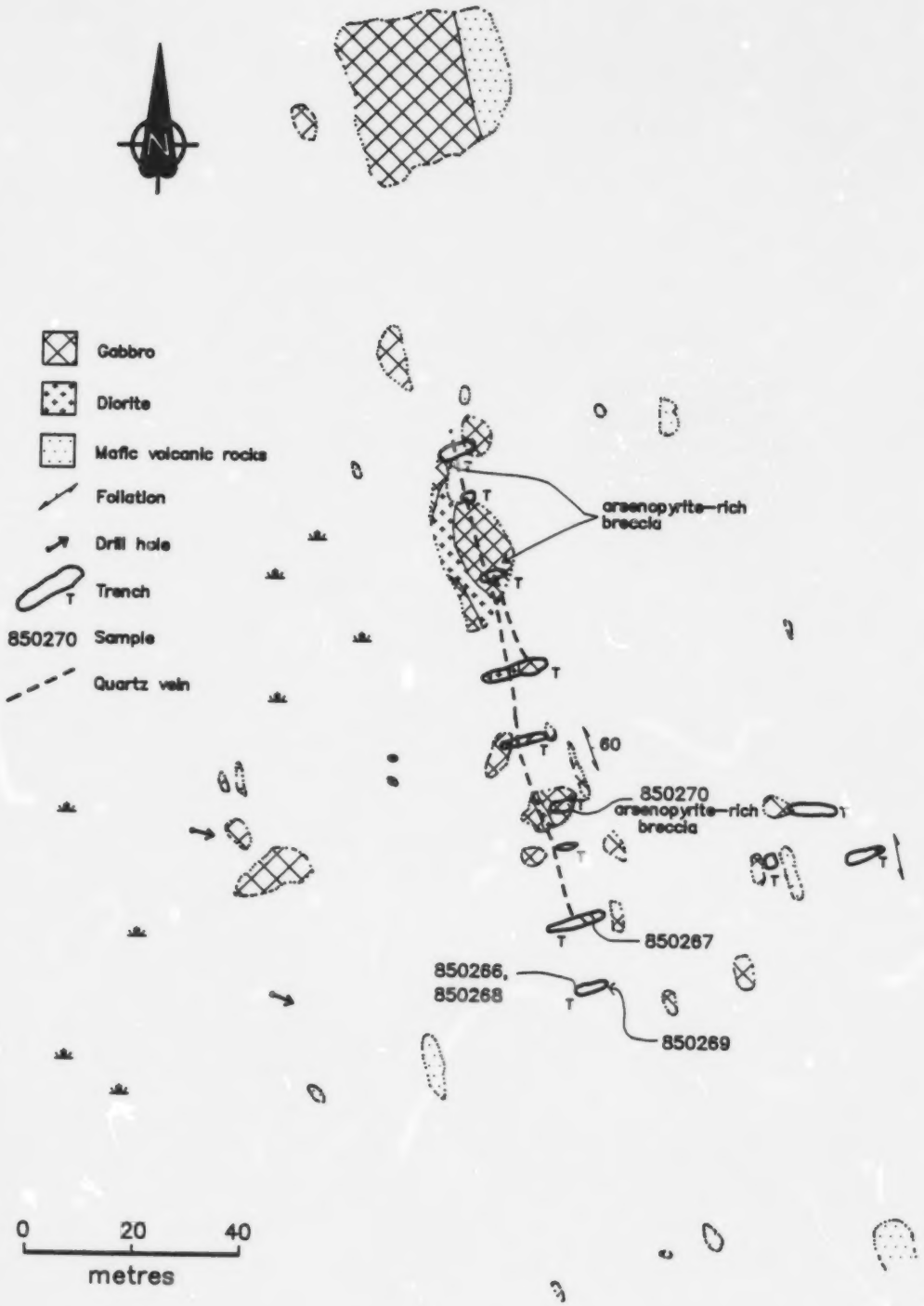


*Figure 13-5: Outcrop distribution, geology, trench and sample locations at the No. 1 Vein (Site C), occurrence 13.*

SITE D (Fig. 13-6)

GEOLOGICAL SETTING:

The two main rock types that occur in the vicinity of site D are fine- to medium-grained mafic intrusions with radiating prismatic amphiboles and a fine grained mafic volcanic rock that is locally silicified (Fig. 13-6). Stringers of quartz and carbonate and rusty weathered areas occur in both rock types.

MINERALIZATION:

Two trenches and stripped outcrop expose a mafic intrusion containing 5% blocky pyrrhotite and 2-3% pyrite. Quartz veins exposed in the trenches are non-mineralized. Mafic volcanic rocks south of this site contain less than 1% pyrite.

GEOCHEMICAL DATA:

Assay data (Table 13-4) and geochemical data (Appendix I) indicate a wide range of Au and As contents in the four samples collected from the trenches and outcrop (Fig. 13-6). Au varies from 11 to 5250 ppb and As from 23 to 1833 ppm.

CLASSIFICATION:

Disseminated mineralization - not classified. It is uncertain whether the sulphide mineralization observed at this site is related to the quartz veins.

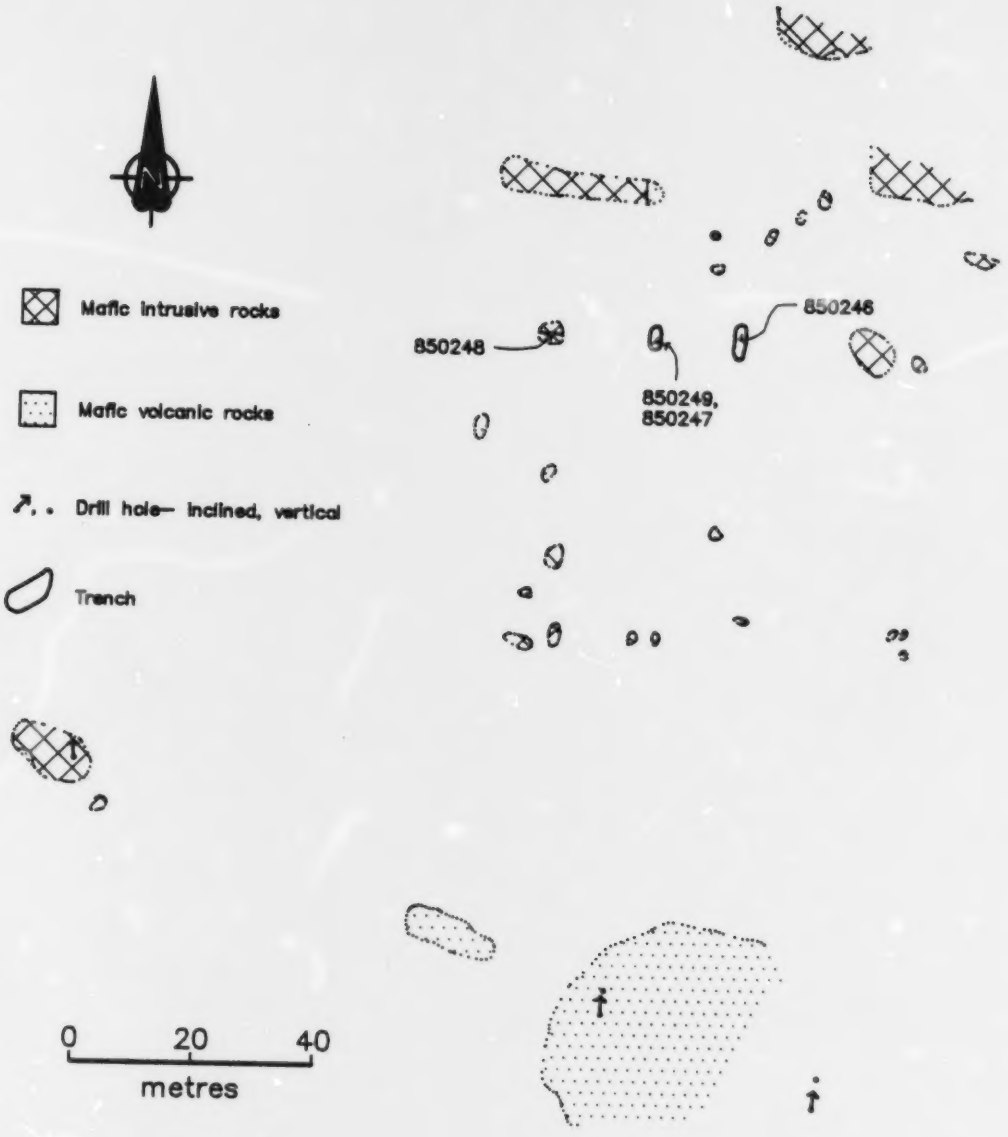


*Figure 13-6: Outcrop distribution, geology, trench and sample locations at Site D, occurrence 13.*

## BLOOD ZONE (SITE E; Fig. 13-7)

### GEOLOGICAL SETTING:

The Blood Zone is hosted within a sequence of Amisk Group mafic pillow breccia and finely bedded mafic volcanic wacke that has been intruded by a large gabbro. The supracrustal rocks have been affected by contact metamorphism, evidenced by the dense growth of unoriented amphibole crystals within 10 m of the contact. The occurrence is coincident with the intersection of two faults at 010° and 320° respectively.

### MINERALIZATION:

A series of seven trenches expose a contact between a large gabbro body to the west and a folded sequence of bedded wacke and mafic flow breccia on the east (Fig. 13-7). The volcanic rocks are crosscut by a shear zone about 5 m wide, striking northwest and dipping shallowly northeast, that contains a large quartz-carbonate vein. The vein is either boudinaged and offset, or composed of a series of extensional veins. The vein segments are composed of smoky quartz and coarse grained carbonate and biotite, plus a green mineral that may be diopside.

At the southeast end of the shear the rock is a biotite-rich schist with abundant pyrrhotite as disseminations and streaks along the foliation planes.

### GEOCHEMICAL DATA:

Five samples were collected from the trenches. Assay data is summarized in Table 13-5 and multi-element geochemical data in Appendix I. Au varies from 2 to 400 ppb and As from 4 to 409 ppm.

### CLASSIFICATION:

Vein-type deposit. Shear-hosted quartz-carbonate vein.

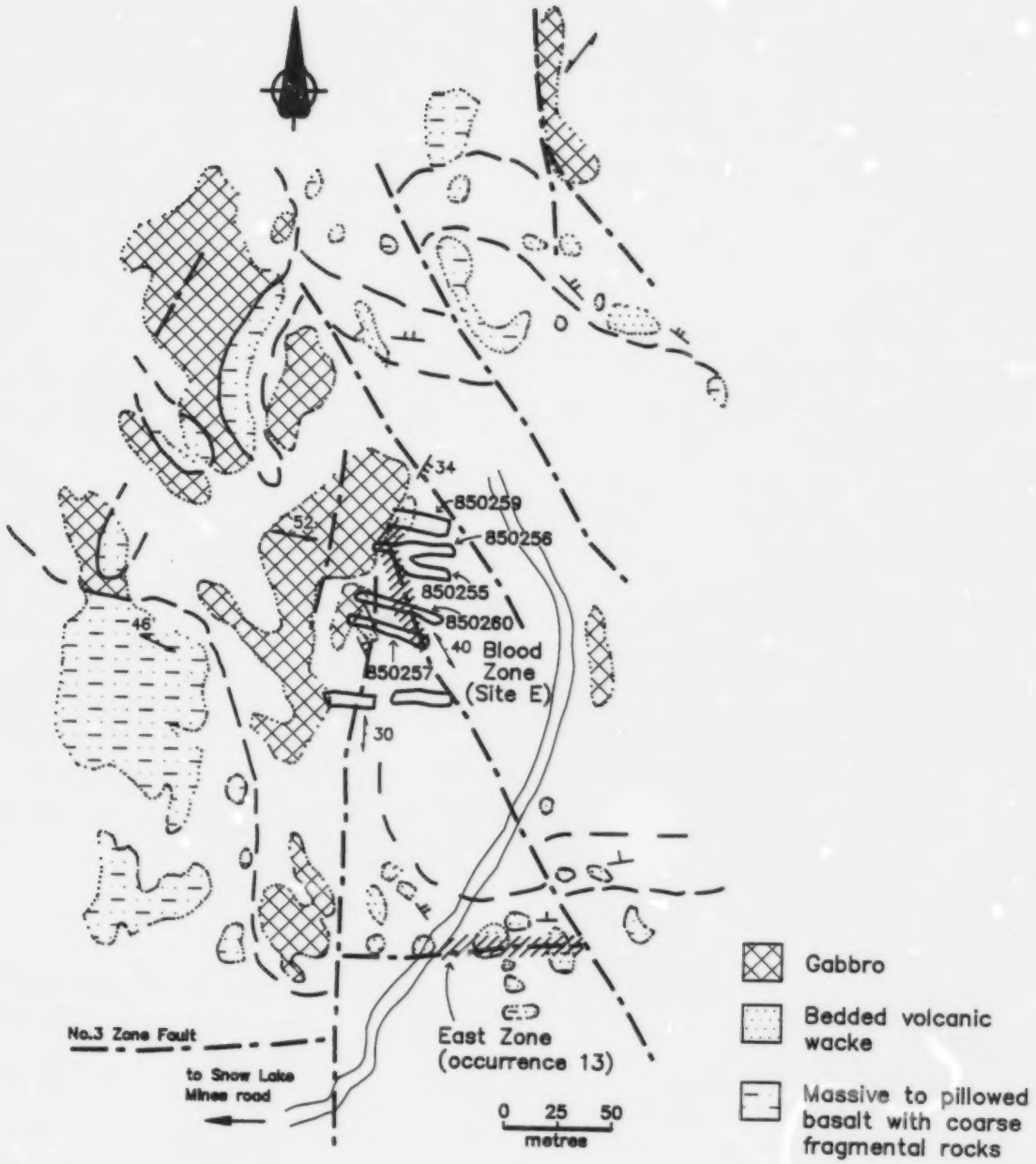


*Figure 13-7: Outcrop distribution, geology, trench and sample locations at the Blood Zone (Site E) and at the East Zone (Site F), occurrence 13.*

## EAST ZONE (SITE F; Fig. 13-7, 13-8)

### GEOLOGICAL SETTING:

The East Zone is hosted within the basal portion of an Amisk Group sequence of massive to pillowed basalt with minor interflow sedimentary rocks. The sequence is intruded by several medium- to coarse-grained gabbros. All rock types have been deformed by northwest-striking folds that have been offset by a number of shears and faults. Some of the faults and shears contain goechemically anomalous concentrations of gold.

### MINERALIZATION:

The occurrence appears to be hosted by a segment of the fault that hosts the Snow Lake Mines Main Zone (No. 3 Vein) and has been offset from this large occurrence by a north-striking fault. Stripping has exposed a sequence of pillowed basalt topped to the north by finely layered mafic volcanic wacke. The sequence is crosscut directly to the west by massive gabbro. The top 2 m of the pillowed basalt sequence contains strongly altered pillows stretched parallel to the basalt-wacke contact. Rocks on both sides of the contact are quite schistose, with intense quartz-carbonate infill between boudins. The schistose alteration zone is less than 1 m wide on surface.

### GEOCHEMICAL DATA:

A single quartz vein/mafic volcanic composite sample was collected from outcrop at the site. The sample contained 195 ppm Au and 7394 ppm As. Multi-element geochemical data are contained in Appendix I.

### CLASSIFICATION:

Vein-type deposit. Disseminated sulphide mineralization occurs within a quartz vein and sheared wallrocks.

*Figure 13-8: Outcrop distribution, geology, trench and sample locations at Site F.*

REFERENCES:


Galley, A.G., Ames, D.E., and Franklin, J.M.

1988: Geological setting of gold mineralization, Snow Lake, Manitoba; Geological Survey of Canada, Open File 1700.

Galley, A.G., Ziehlke, D.V., Franklin, J.M., Ames, D.E. and Gordon, T.M.

1986: Gold mineralization in the Snow Lake-Wekusko Lake region, Manitoba; in Gold in the Western Shield (L.A. Clark, ed.); Canadian Institute of Mining and Metallurgy, Special Volume 38, p. 379-398.

Gonzales, A. and Fedikow, M.A.F.

1984: Mineral deposit studies-Snow Lake area; in Manitoba Energy and Mines, Report of Field Activities 1984, p. 46-51.

Harrison, J.M.

1946: Snow Lake and Nor-Acme Mine area, Manitoba; Geological Survey of Canada, Paper 46-9; maps with side notes.

Harrison, J.M.

1949: Geology and mineral deposits of File-Tramping Lakes area, Manitoba; Geological Survey of Canada, Memoir 250, p. 59, 61-63.

Mineral Inventory Card 63K/16NE Au 16, 17, 19
Manitoba Energy and Mines, Minerals Division.


**TABLE 13-1: Assays from the Sherry Zone (Site A), occurrence 13 (see Fig. 13-3 for sample locations).**

| Sample No. | Au g/t | Ag ppm | Cu ppm | Pb ppm | Zn ppm | Rock Type |
|---|---|---|---|---|---|---|
| 850217 | 0.3 | - | 30 | 3 | 6 | quartz vein |
| 850219 | 1.4 | 1 | 118 | 7 | 286 | host rock |
| 850215 | - | - | 45 | 16 | 35 | quartz vein |
| 850218 | 0.3 | - | 139 | - | 69 | host rock |
| 850220 | 0.3 | - | 146 | - | 96 | host rock |
| 850216 | 0.7 | - | 46 | - | 25 | quartz vein |

**TABLE 13-2: Assays from the No. 2 Vein (Site B), occurrence 13 (see Fig. 13-4 for sample locations).**

| Sample No. | Au g/t | Ag ppm | Cu ppm | Pb ppm | Zn ppm |
|---|---|---|---|---|---|
| 850252 | - | 1 | 156 | - | 65 |
| 850250 | 7.5 | 1 | 188 | - | 75 |
| 850254 | 8.2 | 1 | 205 | - | 68 |
| 850251 | 1.7 | - | 141 | - | 81 |
| 850253 | 12.7 | 1 | 215 | - | 40 |

**TABLE 13-3: Assays from the No. 1 Vein (Site C), occurrence 13 (see Fig. 13-5 for sample locations).**

| Sample No. | Au g/t | Ag ppm | Cu ppm | Pb ppm | Zn ppm | Rock Type |
|---|---|---|---|---|---|---|
| 850266 | 0.3 | - | 116 | - | 72 | |
| 850281 | 1.7 | - | 52 | - | 41 | mafic intrusion |
| 850269 | tr | - | 63 | - | 54 | quartz vein |
| 850267 | - | - | 48 | - | 8 | quartz vein |
| 850270 | - | 2 | 70 | - | 30 | quartz vein |

**TABLE 13-4: Assays from Site D, occurrence 13 (see Fig. 13-6 for sample locations).**

| Sample No. | Au g/t | Ag ppm | Cu ppm | Pb ppm | Zn ppm |
|---|---|---|---|---|---|
| 850246 | 3.1 | - | 59 | - | 16 |
| 850247 | 1.0 | - | 66 | - | 26 |
| 850249 | 1.4 | 1 | 97 | - | 65 |
| 850248 | - | 1 | 53 | - | 35 |

**TABLE 13-5: Assays from the Blood Zone (Site E), occurrence 13 (see Fig. 13-7 for sample locations).**

| Sample No. | Au g/t | Ag ppm | Cu ppm | Pb ppm | Zn ppm | Rock Type |
|---|---|---|---|---|---|---|
| 850259 | - | - | 56 | - | 11 | quartz vein |
| 850256 | 0.3 | - | 186 | - | 61 | mafic intrusion |
| 850255 | tr | - | 43 | - | 10 | quartz vein |
| 850257 | tr | - | 388 | - | 139 | mafic volcanic rock |
| 850269 | - | - | 44 | - | 8 | quartz vein |

**LOCATION: 14**

NAME: BOUNDARY ZONE
UTM: 6084612N/433560E
ACCESS: Gravel road from Snow Lake.

AREA: 900 m north-northwest of the town of Snow Lake
AIRPHOTO: A26366-201

EXPLORATION SUMMARY:

The Boundary Zone is located near the boundaries of the Sky claims and CB 3881. The ground is currently (1988) held by High River Resources Limited.

GEOLOGICAL SETTING:

The Boundary Zone occurs along the contact between Amisk Group felsic volcaniclastic and mafic volcaniclastic formations (Fig. 13-1). At this location the two formations have been tightly folded into the Nor-Acme Anticline (Harrison, 1949). Along the fold nose of the Nor-Acme Anticline the felsic-mafic contact is strongly sheared. The shear fabric is related to a fault that has been traced intermittently to the southeast where it appears to form the southwest contact of a hornblende porphyritic gabbro.

MINERALIZATION:

Little information is available on the nature of this occurrence. Gold mineralization is mainly restricted to the felsic footwall rocks. These footwall rocks are strongly altered and brecciated and contain erratic gold values. Similarities to the Nor-Acme deposit have been suggested.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Replacement-type deposit. Galley et al. (1988) interpret gold mineralization in the Snow Lake area, including the Boundary Zone, to be associated with carbonatization that overprints the regional metamorphic assemblage. It is controlled by a series of late-D2 reverse faults in the hangingwall block of the McLeod Road Fault.

REFERENCES:

Galley, A.G., Ames, D.E., and Franklin, J.M.
1988: Geological setting of gold mineralization, Snow Lake, Manitoba; Geological Survey of Canada, Open File 1700.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping Lakes area, Manitoba; Geological Survey of Canada, Memoir 250, p. 59, 61-63.

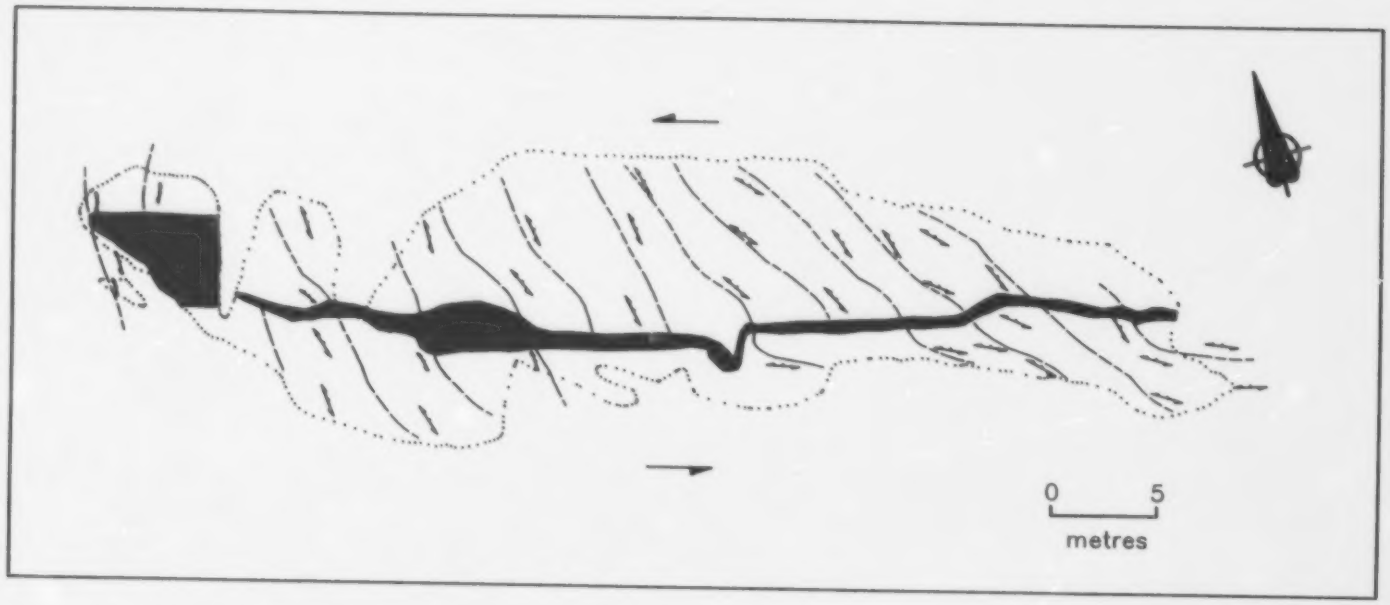


*Figure 15-1: Outcrop of mafic heterolithic tuff breccia crosscut by a vein related to the Gold Fields Main Zone (from Galley et al., 1986).*

**LOCATION:** 15

NAME: GOLD FIELDS PROPERTY / SNOW LAKE MINES GROUP / NO. 3 ZONE

UTM: 6083854N/433333E

ACCESS: Gravel road from Snow Lake.

AREA: 1.3 km north-northwest of the town of Snow Lake (Fig. 13-1)

AIRPHOTO: A26366-201

EXPLORATION SUMMARY:

In 1942 C.R. Parres recorded claim Dick 16 over occurrence 15 and transferred its ownership to Nor-Acme Gold Mines Limited. Nor-Acme leased the ground (Lease M-1261) in 1943 and subleased it to Howe Sound Exploration Company Limited in 1943. The lease was cancelled in 1964. J. McNevin recorded Nov 1 in 1964, and in 1965 assigned it to Canadian Nickel Company Limited who performed a magnetometer survey on the ground. The claim was cancelled in 1970. W. Bruce Dunlop Limited (NPL) staked CB 3881 in 1971. Granges Exploration Aktiebolag optioned the claim in 1980-81 and conducted linecutting and an electromagnetic survey. The property was transferred to Darius Gold Mine Incorporated in 1982, and later that year to Gold Fields Canadian Mining Limited who carried out linecutting, a VLF-EM survey and diamond drilling. HBM&S diamond drilled 3406 m under option in 1985-86 (Mineral Inventory Card 63K/16 Au 16, 17, 19). In 1986 Silver Hart Mines Limited, and later that year, Snow Lake Mines Limited acquired the property under an agreement with W. Bruce Dunlop Ltd. Diamond drilling was conducted in 1987-88 (Mineral Inventory Card 63K/16 Au 16, 17, 19). In 1987 Snow Lake Mines announced reserves of 617 000 tonnes grading 9.6 g/t Au for the No. 3 Zone (Galley et al., 1988).

GEOLOGICAL SETTING:

The following information was summarized from Galley et al. (1986). The Snow Lake Mines property is underlain by northwest striking, northeast dipping mafic volcanic rocks. Massive to pillowed mafic flows characterize the northern part of the property and mafic heterolithic fragmental rocks occur in the southern part of the property. The No. 3 Zone is situated in the southern portion of the property approximately 200m east of the McLeod Road Thrust Fault. The dominant foliation at the occurrence strikes north-northwest and dips 55° to the east (Galley et al, 1986).

The area contains numerous faults marked by 1-2 m wide schistose zones that are interpreted to splay from the McLeod Road Thrust Fault. These faults are typically curvilinear and strike from 080° to 285°. A 2-60 cm wide mylonite zone that contains carbonate, quartz, and epidote forms the hanging wall to the mineralization. Deflection of the foliation about the No. 3 zone indicates sinistral movement in the fault/shear zone parallel to the auriferous zone (Fig. 15-1).

MINERALIZATION:

The gold bearing zone is 2-11 m thick with a strike length of 200 m and a downdip extension of 100 m. Numerous faults occur within the mineralized zone as well as a quartz vein stockwork that is developed at a low angle to the fault direction. The gold zone is bounded in the hanging wall by a 2-60 cm wide fault with mylonitic texture. This fault is characterized by a mineralogy dominated by carbonate, quartz, and epidote. Appreciable gold is absent from this zone. The hanging wall fault, subsidiary faults and sub-parallel gold zone are curvilinear. The strike of the mineralized zone varies from 285° at its northwest extremity to 080° at its east end.

Detailed examination of surface exposures at the occurrence indicate the strike of the foliation is asymmetrical about the veins. The Z-shape of the foliation indicates sinistral movement within a brittle-ductile shear zone. Harrison (1949) and Galley et al (1986) propose fluid emplacement in a schistose zone that developed at or near the contact between the mafic heterolithic fragmental rocks (that host the deposit) and massive pillowed basalt for formation of the No. 3 vein. Alteration of the mafic heterolithic fragmental rocks is reflected by the presence of biotite, chlorite and garnet. The mineralization in the gold zone comprises up to 10% medium- to fine-grained arsenopyrite, 0-5% pyrite, traces of chalcopyrite and up to 5% tourmaline. The highest gold values are correlated to fine grained felted masses of arsenopyrite that commonly occur along the margins of quartz veins (Galley et al., 1986).

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Vein-type deposit.

REFERENCES:

Galley, A.G., Ames, D.E., and Franklin, J.M.

1988: Geological setting of gold mineralization, Snow Lake, Manitoba; Geological Survey of Canada, Open File 1700.

Galley, A.G., Ziehlke, D.V., Franklin, J.M., Ames, D.E. and Gordon, T.M.

1986: Gold mineralization in the Snow Lake-Wekusko Lake region, Manitoba; in Gold in the Western Shield (L.A. Clark, ed.); Canadian Institute of Mining and Metallurgy, Special Volume 38, p. 379-398.

Harrison, J.M.

1949: Geology and mineral deposits of File-Tramping Lakes area, Manitoba; Geological Survey of Canada, Memoir 250, p. 59, 61-63.

Mineral Inventory Card 63K/16 Au 16, 17, 19
Manitoba Energy and Mines, Minerals Division.

**LOCATION: 16**

NAME: BIRCH ZONE
UTM: 6905N/433591E
ACCESS: Drill road.

AREA: 2.5 km north of the town of Snow Lake
AIRPHOTO: A26366-201

EXPLORATION SUMMARY:

In 1942 C.R. Parres recorded claim Dick 16 over occurrence 16 and transferred its ownership to Nor-Acme Gold Mines Limited. Nor-Acme leased the ground (Lease M-1261) in 1943 and subleased it to Howe Sound Exploration Company Limited in 1943. The lease was cancelled in 1964. J. McNevin recorded Nov 1 in 1964, and in 1965 assigned it to Canadian Nickel Company Limited who performed a magnetometer survey on the ground. The claim was cancelled in 1970. W. Bruce Dunlop Limited (NPL) staked CB 3881 in 1971. Granges Exploration Aktiebolag optioned the claim in 1980-81 and conducted linecutting and an electromagnetic survey. The property was transferred to Darius Gold Mine Incorporated in 1982, and later that year, to Gold Fields Canadian Mining Limited who carried out linecutting, a VLF-EM survey and diamond drilling. HBM&S diamond drilled 3406 m under option in 1985-86 (Mineral Inventory Card 63K/16 Au 16, 17, 19). In 1986 Silver Hart Mines Limited, and later that year, Snow Lake Mines Limited acquired the property under an agreement with W. Bruce Dunlop Ltd. Diamond drilling was conducted in 1987-88 (Mineral Inventory Card 63K/16 Au 16, 17, 19). In 1987 Snow Lake Mines announced reserves of 617 000 tonnes grading 9.6 g/t Au for the No. 3 Zone (Galley et al., 1988)(see Occurrence 15, this volume).

GEOLOGICAL SETTING:

The following information was summarized from Galley et al. (1986). The Snow Lake Mines property is underlain by northwest-striking mafic volcanic rocks that dip to the northeast. These rocks are flanked to the north by massive to pillowed mafic flows and to the south by mafic heterolithic fragmental rocks (Fig. 16-1). The southernmost part of the property is underlain by felsic tuff and lapilli-tuff. These rock units have been assigned to the Amisk Group. Hornblendite dykes and sills intrude the volcanic stratigraphy.

MINERALIZATION:

The Birch Zone is 120 m or more in strike length and extends 180 m downdip (Richardson and Ostry, 1987). The Birch Zone is characterized by a biotite-chlorite-garnet alteration mineral assemblage, quartz vein stockwork, carbonatization halo and auriferous arsenopyrite-bearing mineralization (cf. locations 13, 14 and 15).

GEOCHEMICAL DATA:

Drill-indicated reserves in 1987 were "at least" 127 000 tonnes grading 18.1 g/t Au over an average width of 1.87 m (Richardson and Ostry, 1987).

CLASSIFICATION:

Replacement-type deposit. Galley et al. (1988) interpret gold mineralization in the Snow Lake area, including the Birch Zone, to be associated with carbonatization that overprints the regional metamorphic assemblage. It is controlled by a series of late-D2 reverse faults in the hanging wall block of the McLeod Road Fault.

REFERENCES:

Galley, A.G., Ames, D.E., and Franklin, J.M.
1988: Geological setting of gold mineralization, Snow Lake, Manitoba; Geological Survey of Canada, Open File 1700.

Galley, A.G., Ziehlke, D.V., Franklin, J.M., Ames, D.E. and Gordon, T.M.
1986: Gold mineralization in the Snow Lake-Wekusko Lake region, Manitoba; in Gold in the western shield (L.A. Clark, ed.); Canadian Institute of Mining and Metallurgy, Special Volume 38, p. 379-398.

Mineral Inventory Card 63K/16NE Au 16, 17, 19
Manitoba Energy and Mines, Minerals Division.

Richardson, D.J. and Ostry, G.M.
1987: Gold deposits of Manitoba; Manitoba Energy and Mines, Economic Geology Report ER86-1, p. 56-57.

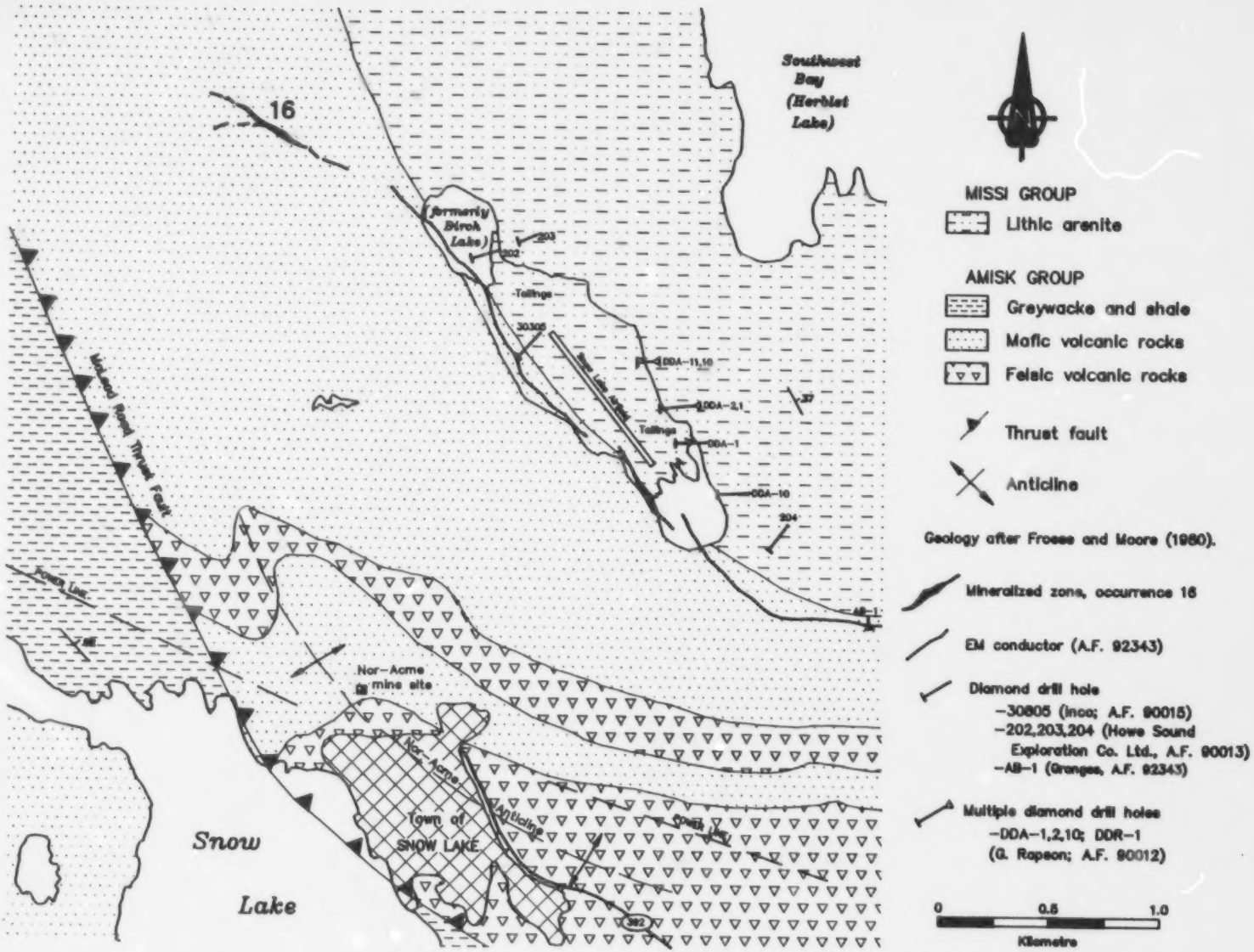


*Figure 16-1: Geological setting of occurrence 16*

**LOCATION:** 17

NAME:

UTM: 6079791N/433563E

ACCESS: Provincial Highway No. 395.

AREA: South shore of Snow Lake

AIRPHOTO: A26366-243

EXPLORATION SUMMARY:

The occurrences at the south end of Snow Lake were first staked as the Laura claim in 1924 by L. Little. The King Solomon claim was staked over the area by J. Campbell in 1925. International Mining Corporation (Canada) Limited undertook 61 m of diamond drilling in 1946 (no records available). The area was covered by electromagnetic and magnetometer surveys conducted by HBED in 1956. The occurrence has been leased since 1959 by HBM&S in connection with their Cu-Zn deposits at nearby Chisel, Lost and Ghost lakes (Mineral Inventory Card 63K/16SE Au4).

GEOLOGICAL SETTING:

The general area of occurrence 17 is underlain by quartzite, flanked to the northeast by greywacke, shale, and mafic and felsic volcanic rocks and to the southwest by mafic volcanic rocks. These rock units have been assigned to the Amisk Group. The occurrence is adjacent to a shear zone that appears to splay from a fault mapped in the centre of Snow Lake (Fig. 17-1). The trace of the Threehouse Synform axial surface has been mapped in the vicinity of the occurrence. At the occurrence the host rocks are strongly foliated, carbonatized, amphibolized and silicified fine grained mafic volcanic flows (Fig. 17-2).

MINERALIZATION:

Small, narrow, discontinuous quartz veins containing minor pyrite, pyrrhotite and arsenopyrite characterize the mineralization at occurrence 17. Harrison (1949) notes that the sulphide minerals preferentially occur in the volcanic wall rocks at the vein margins. One trench contains a 10 cm thick, iron stained, pyrite- and chalcopyrite-bearing (2-3%) quartz vein oriented at 313°/47°E hosted by rusty weathered, disseminated sulphide-bearing (2%) mafic volcanic rock.

GEOCHEMICAL DATA:

Two samples were collected for geochemical analysis from an old trench at the lakeshore (Fig. 17-2, Appendix I). Low values for Pb, Zn, Au and Ag were obtained. Maximum contents for As and Cu were 937 ppm and 173 ppm, respectively.

CLASSIFICATION:

Vein-type deposit. Sulphide-bearing quartz veins within strongly foliated mafic volcanic rocks.

REFERENCES:


Froese, E. and Moore, J.M.

1980: Metamorphism in the Snow Lake area, Manitoba; Geological Survey of Canada, Paper 78-27, 16 p.

Gonzales, A. and Fedikow, M.A.F.

1984: Mineral deposit studies, Snow Lake Area; in Manitoba Energy and Mines, Report of Field Activities 1984, p. 46-52.

Harrison, J.M.

1949: Geology and mineral deposits of File-Tramping Lakes area, Manitoba; Geological Survey of Canada, Memoir 250, p. 57-58.

Mineral Inventory Card No. 797, NTS 63K/16NE Au4
Manitoba Energy and Mines, Minerals Division.

Russell, G.A.

1957: Structural studies of the Snow Lake-Herb Lake area; Mines Branch, Publication 55-3, 33 p.

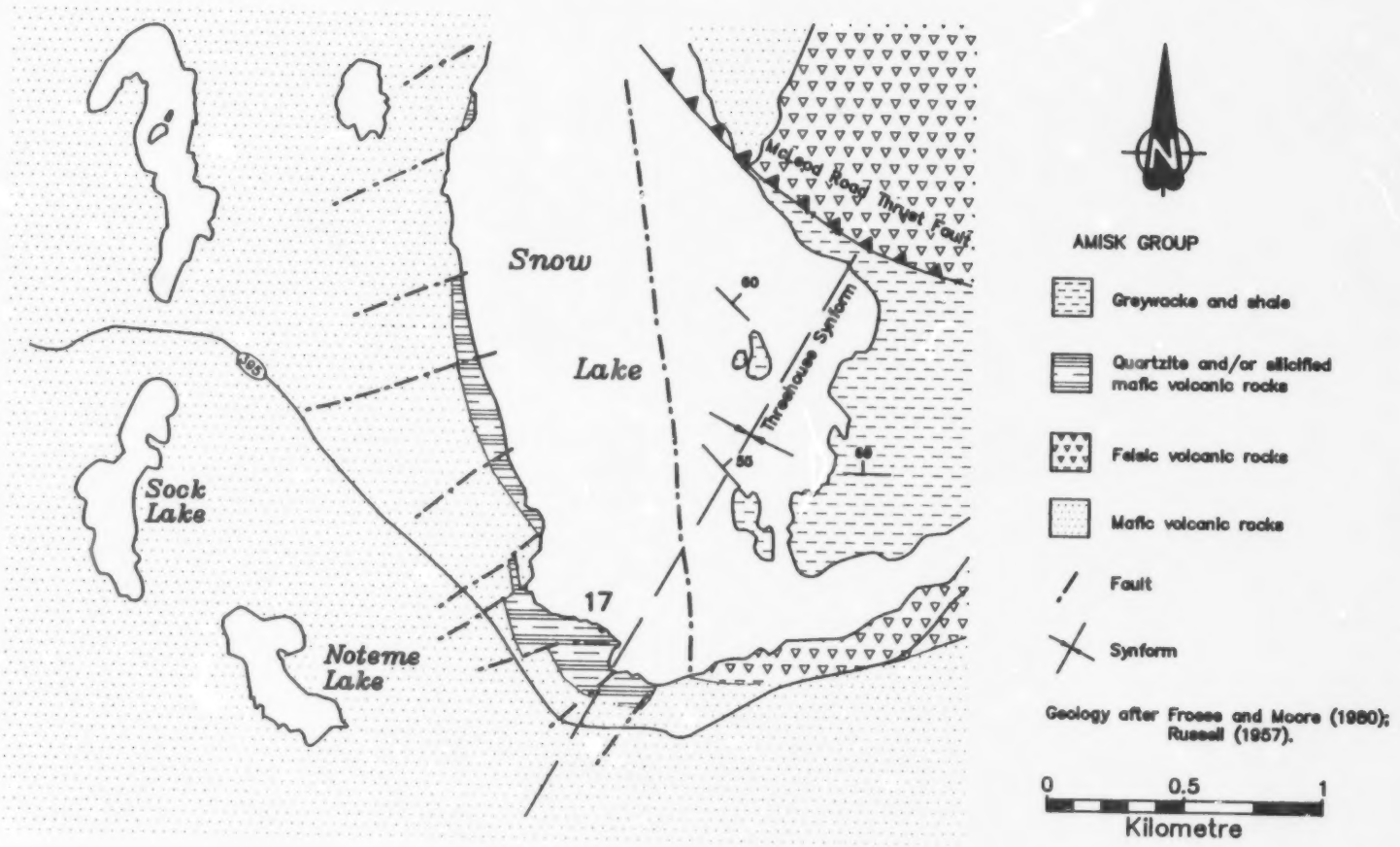


*Figure 17-1: Geological setting of occurrence 17*

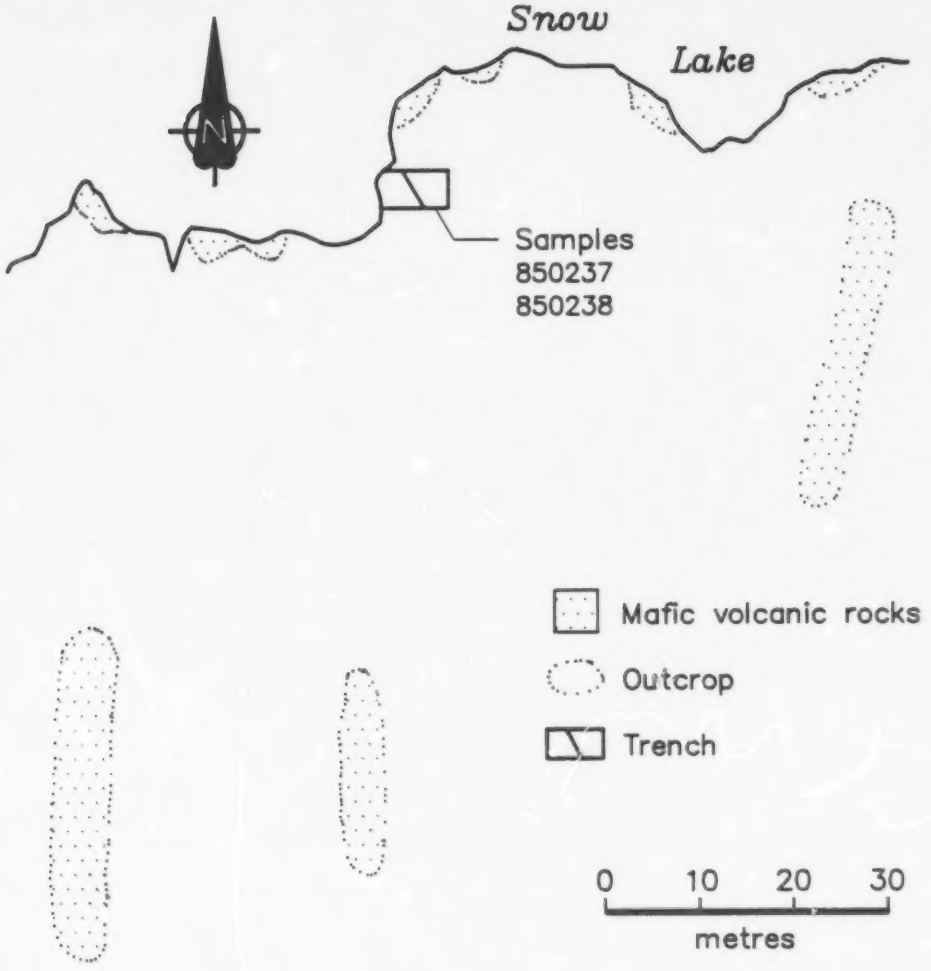


*Figure 17-2: Outcrop distribution, geology, trench and sample locations at occurrence 17.*

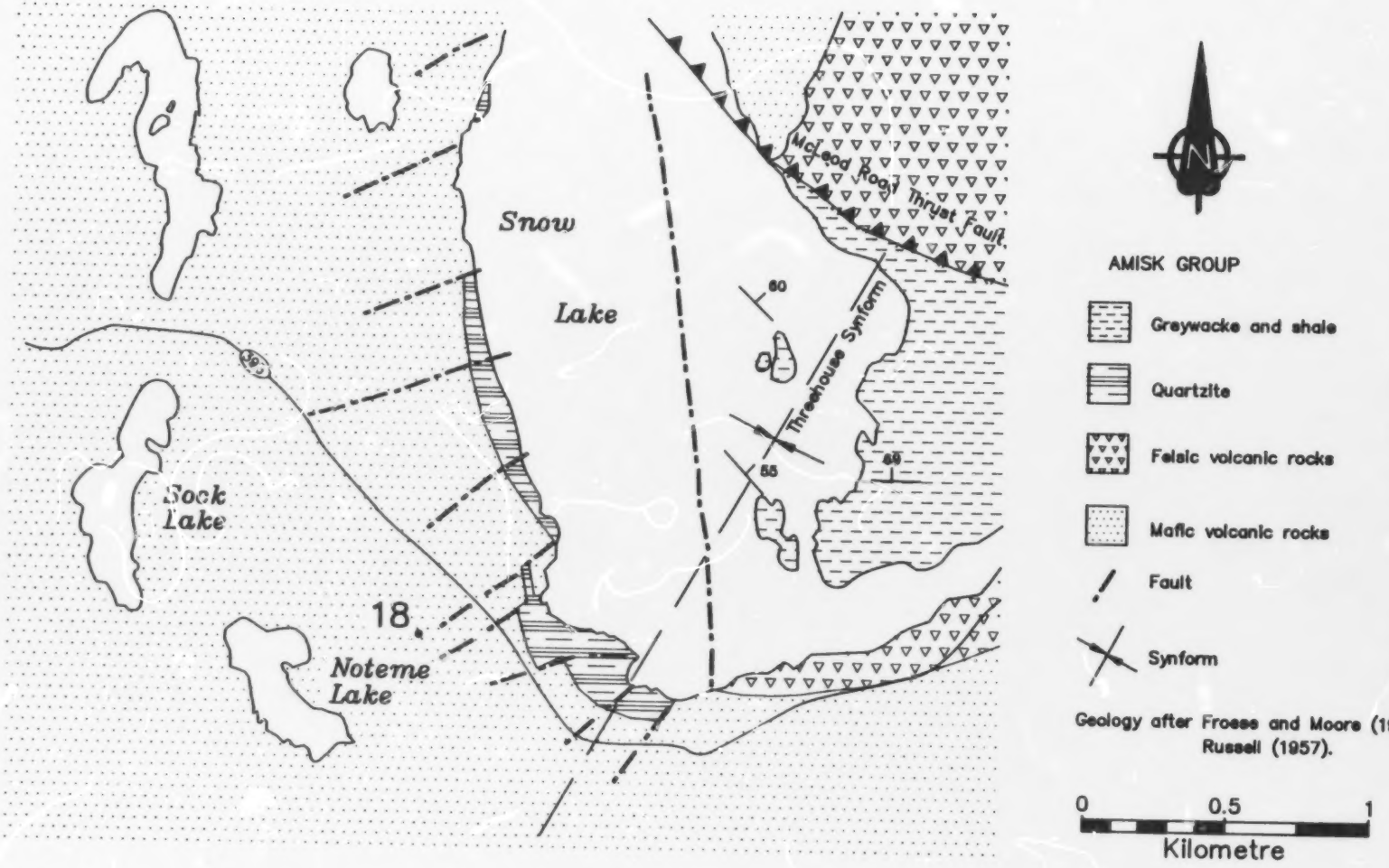


*Figure 18-1: Geological setting of occurrence 18*

**LOCATION: 18**

NAME: NOTEME LAKE
UTM: 6079750N/432891E
ACCESS: Provincial Highway No. 395.

AREA: Notheast of Noteme Lake
AIRPHOTO: A26366-243

EXPLORATION SUMMARY:

The area around occurrence 18 was held by Tern Lake Mines Limited from the 1940's until 1971, and by Ruttan Lake Explorations Limited from 1971 to 1976. HBED has held the ground as CB 5778 since 1976.

GEOLOGICAL SETTING:

The general area of occurrence 18 is underlain by mafic volcanic rocks flanked to the northeast by quartzite, felsic and mafic volcanic rocks, and greywacke and shale (Fig. 18-1). These rock units have been assigned to the Amisk Group. At the occurrence fine grained, locally silicified and rusty weathered mafic volcanic rocks and lesser medium- to coarse-grained mafic intrusive rocks are observed (Fig. 18-2). The occurrence lies along the southwest extrapolation of one of a series of splays from a major fault postulated to occur in Snow Lake (Fig. 18-1). Carbonatization and amphibolization are common alteration types associated with these splays (Harrison, 1949).

MINERALIZATION:

Disseminated arsenopyrite (maximum 3%) occurs in 0.5 m thick quartz-carbonate stringers and veins. Sulphide mineralization is most abundant at the vein/wall rock contact with 5-15% arsenopyrite, 1-5% pyrite and 1-3% pyrrhotite.

GEOCHEMICAL DATA:

Five samples were collected within and adjacent to six overgrown trenches (Fig. 18-2); results of geochemical analyses are presented in Appendix I. One muck sample (850264) contained 1850 ppb Au and 16769 ppm As. A second sample (850265) contained 350 ppb Au and 328 ppm As. Harrison (1949) noted the gold content of rocks at the Noteme occurrence as "very low".

CLASSIFICATION:

Vein-type deposit. Sulphide-bearing quartz-carbonate veins associated with strongly foliated mafic volcanic rocks.

REFERENCES:


Froese, E. and Moore, J.M.

1980: Metamorphism in the Snow Lake area, Manitoba; Geological Survey of Canada, Paper 78-27, 16 p.

Gonzales, A. and Fedikow, M.A.F.

1984: Mineral deposit studies, Snow Lake area; in Manitoba Energy and Mines, Report of Field Activities, p. 46-52.

Harrison, J.M.

1949: Geology and mineral deposits of File-Tramping Lakes area, Manitoba; Geological Survey of Canada, Memoir 250, p. 73.

Russell, G.A.

1957: Structural studies of the Snow Lake-Herb Lake area; Manitoba Mines Branch, Publication 55-3, 33 p.

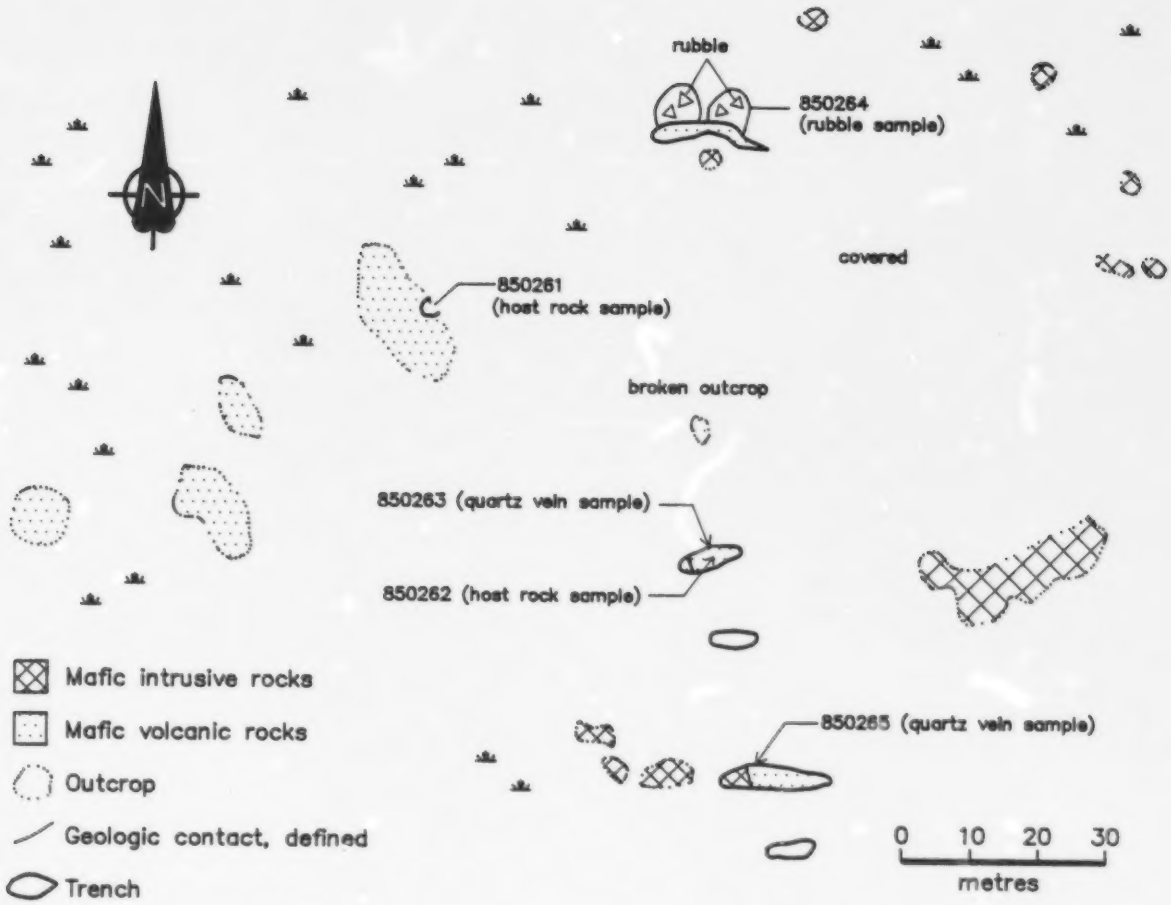


*Figure 18-2: Outcrop distribution, geology, trench and sample locations at occurrence 18.*

**LOCATION:** 19

NAME: TRAMPING LAKE
UTM: 606816N/434652E
ACCESS: Boat and traverse.

AREA: Northern Tramping Lake
AIRPHOTO: A26366-212

EXPLORATION SUMMARY:

Trenching and drilling in the vicinity of occurrence 19 were reported by Harrison (1949). J.R. Mitchell recorded claims over occurrence 19 in 1957. An electromagnetic survey was recorded in 1957 by Selco Exploration Company Limited (A.F. 90236). Newkirk Mining Corporation Limited conducted magnetometer, resistivity and electromagnetic surveys over ground west of the Tramping Lake occurrence in 1956 (A.F. 90233). Conwest Exploration Company Limited conducted an electromagnetic survey on the property in 1964 (A.F. 90239). A.J. O'Donnell held the ground from 1973-1976; Granges Exploration Aktiebolag held the ground from 1980-1983. Clair Pilgrim held the ground from 1984-1986; claim Pat 5, staked by Clair Pilgrim in 1986 is pending recording.

GEOLOGICAL SETTING:

The Tramping Lake occurrence is hosted by rusty weathered, silicified and chloritized Amisk Group mafic volcanic rocks (Fig. 19-1). These rocks are very fine- to medium-grained and equigranular. Harrison (1949) suggests that the mafic volcanic rocks from the peninsula represent an upthrust or down-dropped fault block.

MINERALIZATION:

Sulphide mineralization consists of 1-2% disseminated pyrite and minor pyrrhotite concentrated in streaks along fractures in silicified mafic volcanic rock.

GEOCHEMICAL DATA:

Three samples were collected for analysis (Fig. 19-1); results are presented in Appendix I. Cu values range from 136 to 226 ppm; maximum concentrations for As, Zn and Pb are 1250 ppm, 263 ppm and 153 ppm, respectively. Au values are very low.

CLASSIFICATION:

Disseminated mineralization - not classified. Sulphide mineralization associated with fractures in altered, strongly foliated, mafic volcanic rocks. This occurrence has apparent similarities to alteration associated with the Snow Lake massive sulphide-type deposits.

REFERENCES:


Assessment Files 90233, 90239, 92106, 92173
Manitoba Energy and Mines, Minerals Division.

Eccles, D.R. and Fedikow, M.A.F.
1985: Mineral occurrence documentation and alteration zone mapping, Snow Lake area; in Manitoba Energy and Mines, Report of Field Activities 1985, p. 82-99.

Froese, E. and Moore, J.M.
1980: Metamorphism in the Snow Lake area, Manitoba; Geological Survey of Canada, Paper 78-27, 16 p.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping Lakes area, Manitoba; Geological Survey of Canada, Memoir 250, p. 80-81.

Mineral Inventory Card 63K/16NE Pyr4
Manitoba Energy and Mines, Minerals Division.

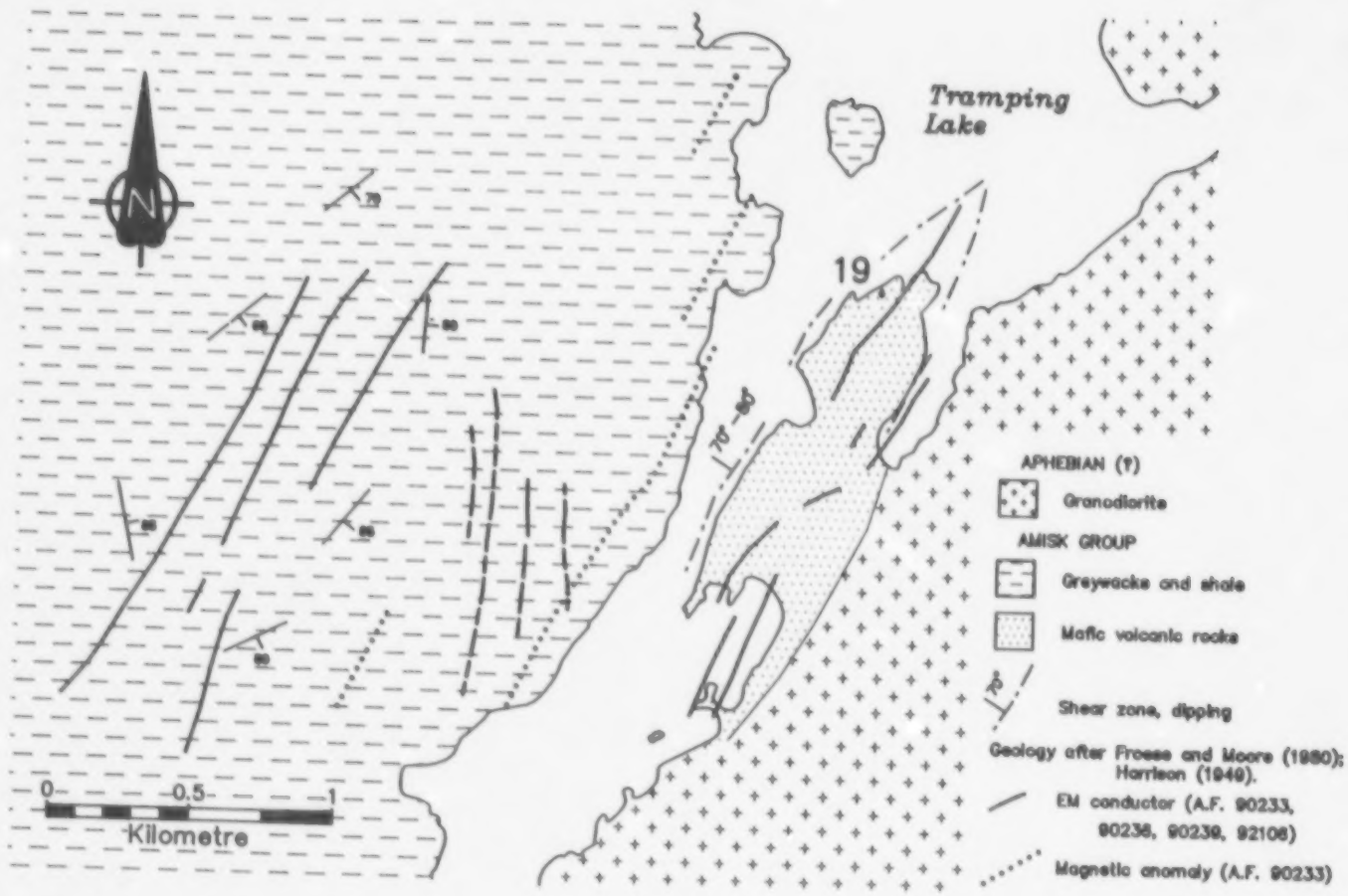


*Figure 19-1: Geological setting of occurrence 19*

**LOCATION:** 20

**NAME:** JOANNIE; (ANDERSON LAKE[1]); (EAGLE)
**UTM:** 6076349N/434500E
**ACCESS:** Boat from the Anderson Lake minesite.

**AREA:** Southwest of Anderson Lake
**AIRPHOTO:** A26366-206

EXPLORATION SUMMARY:

The area around occurrence 20 was first recorded as part of the W.J. claims by B. Kobar in 19[illegible] but Wright's (1931) notes on several trenches indicate an older history of exploration activity in the area. Trenching and diamond drilling (extent unknown) are mentioned by Harrison (1949). In 1954 and 1955 parts of the area were staked as the Joannie claims and the Ox claims, respectively. HBED acquired both parcels of ground in 1955 and drilled 22 holes (total 4470 m). The portion of the occurrence covered by the Ox claim (a.k.a. Anderson Lake[1] or Eagle) has been leased since 1960 by HBM&S The portion covered by the Joannie claims has been held by HBED since 1962.

GEOLOGICAL SETTING:

The general area of occurrence 20 is underlain by felsic volcanic rocks, flanked to the southeast by quartz-eye tonalite and mafic volcanic rocks and to the northwest by mafic and felsic volcanic rocks (Fig. 20-1). These rock units have been assigned to the Amisk Group. At the occurrence the host rocks are hornblende-rich intermediate volcanic flows and fragmental rocks (Fig. 20-1). Eccles and Fedikow (1985) describe eight discontinuous units of mafic and intermediate volcanic flows and fragmental rocks (Fig. 20-2). Among the eight units is a chlorite-garnet-biotite schist (unit 3, Fig. 20-2) produced as the result of mineralization-related alteration of fragmental hornblende andesite (unit 2, Fig. 20-2).

MINERALIZATION:

Chlorite-garnet-biotite schist is crosscut by quartz veins that contain vestiges of assimilated wall rock and very minor disseminated sulphide. Figure 20-3 displays quartz vein, trench and sample locations. Pyrite, pyrrhotite and chalcopyrite, average 1-6% combined, are disseminated throughout the schist.

Eccles and Fedikow (1985) suggest that the Joannie occurrence represents either mineralization associated with a discrete exhalative vent or sulphide deposition associated with downslope wasting of the Anderson Lake Mine mineralization. The latter hypothesis would require that the Joannie and Anderson Lake Mine mineralization are stratigraphically correlatable; this relationship is uncertain.

GEOCHEMICAL DATA:

Six samples were collected for analysis (Appendix I). Anomalous Cu values up to 12497 ppm were obtained from one trench. Several samples contained anomalous Au values up to 495 ppb Au. Zn, Mo, Pb and As contents were low. Diamond drill records indicate the presence of chalcopyrite, but assays are not included with drill logs (A.F. 90025).

CLASSIFICATION:

Stratabound massive sulphide-type deposit. Disseminated stratabound mineralization associated with intense massive sulphide-type alteration.

REFERENCES:


Assessment File 90025
Manitoba Energy and Mines, Minerals Division.

Davies, J.F., Bannatyne, B.B., Barry, G.S., and McCabe, H.R.
1962: Geology and Mineral Resources of Manitoba; Manitoba Mines Branch, Special Publication, p. 85, 90.

Eccles, D.R. and Fedikow, M.A.F.
1985: Mineral occurrence documentation and alteration zone mapping, Snow Lake area; in Manitoba Energy and Mines, Report of Field Activities 1985, p. 82-99.

Froese, E. and Moore, J.M.
1980: Metamorphism in the Snow Lake area, Manitoba; Geological Survey of Canada, Paper 78-27, 16 p.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping Lakes area, Manitoba; Geological Survey of Canada, Memoir 250, p. 51-52.

Mineral Inventory Card 63K/16SE Cu1
Manitoba Energy and Mines, Minerals Division.

Mineral Inventory Card 63K/16SE Cu4
Manitoba Energy and Mines, Minerals Division.

Wright, J.E.
1931: Geology and mineral deposits of a part of northwest Manitoba; Geological Survey of Canada, Summary Report 1930, Part C, p. 109c.


1 Note that this differs from the Anderson Lake Mine.

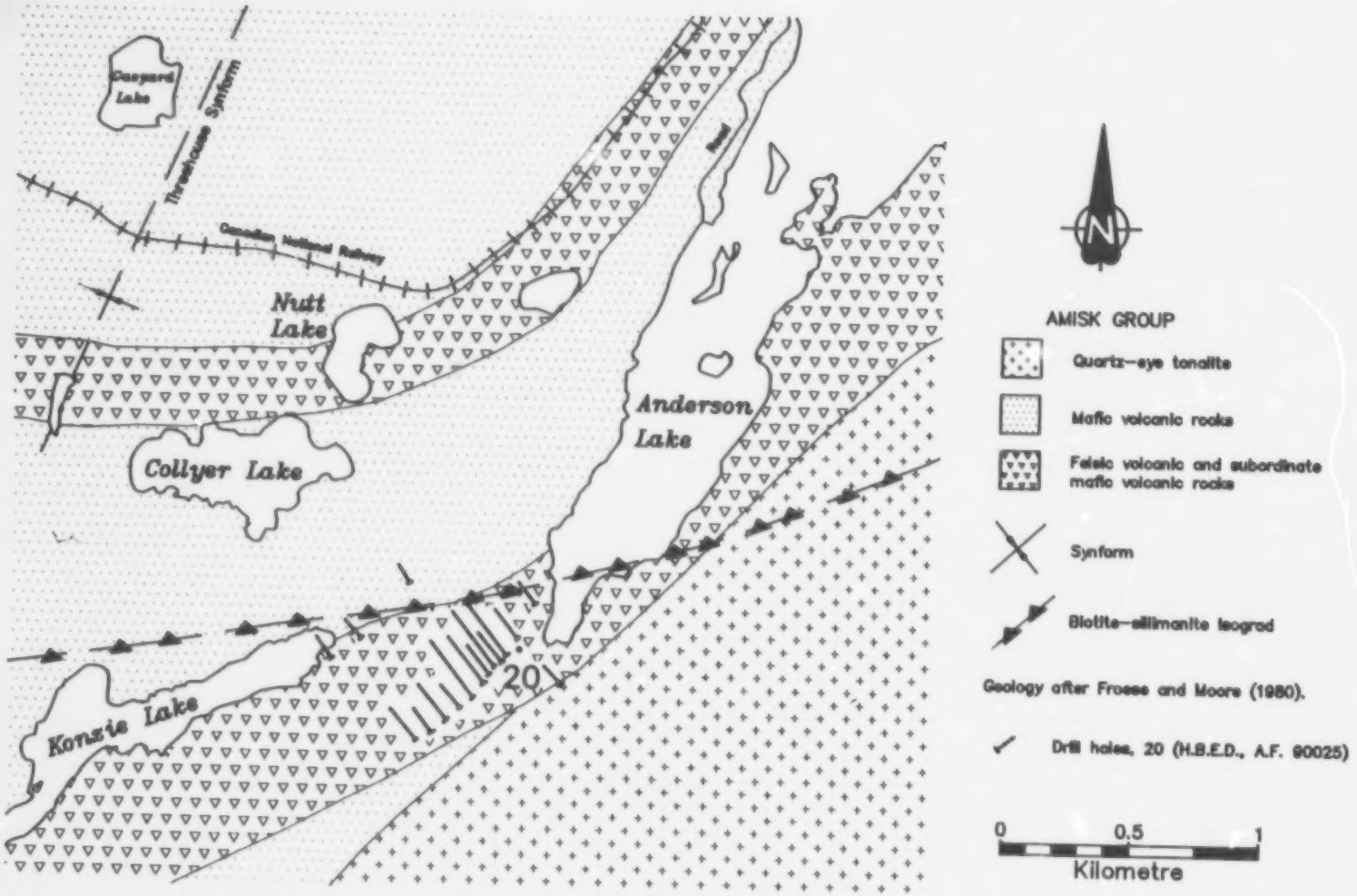


*Figure 20-1: Geological setting of occurrence 20*

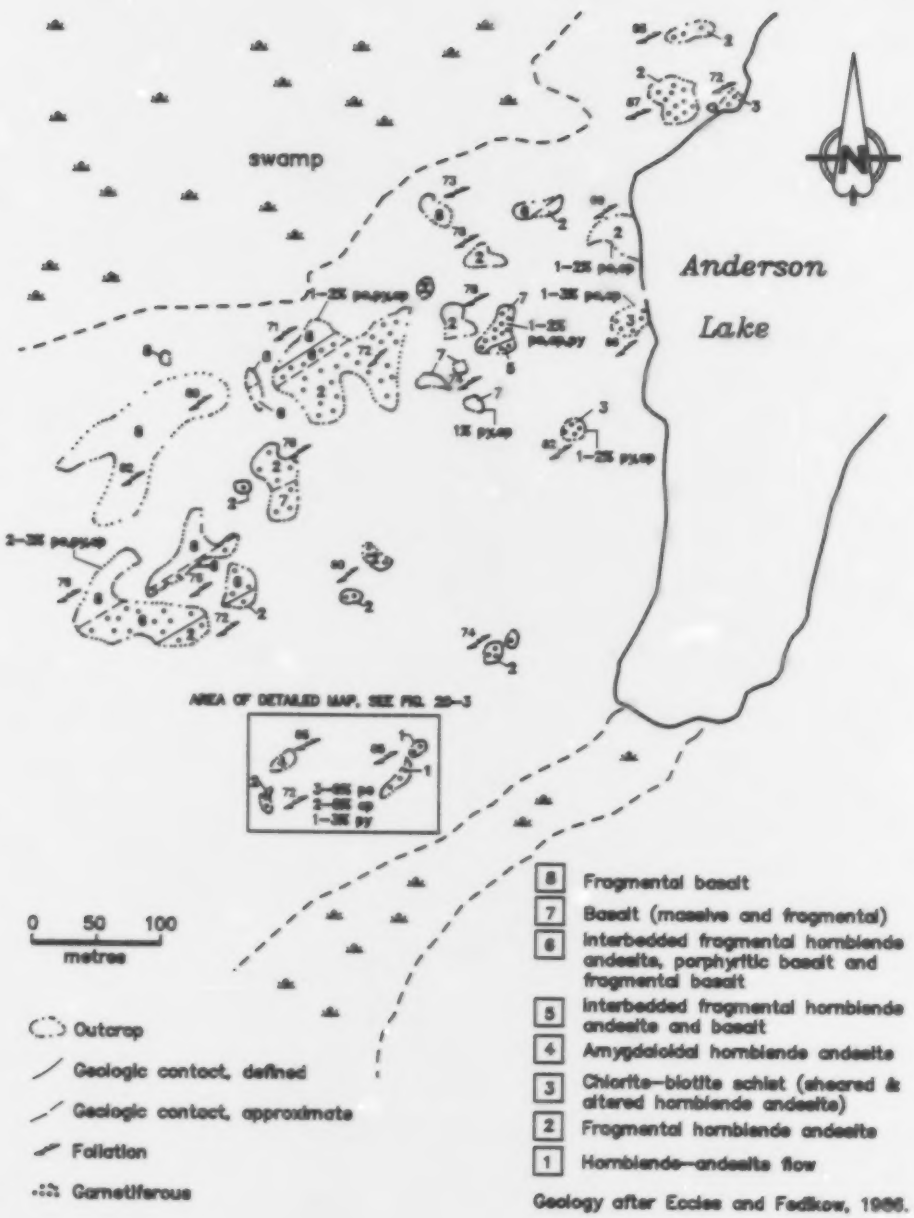


*Figure 20-2: Detailed geology of occurrence 20.*

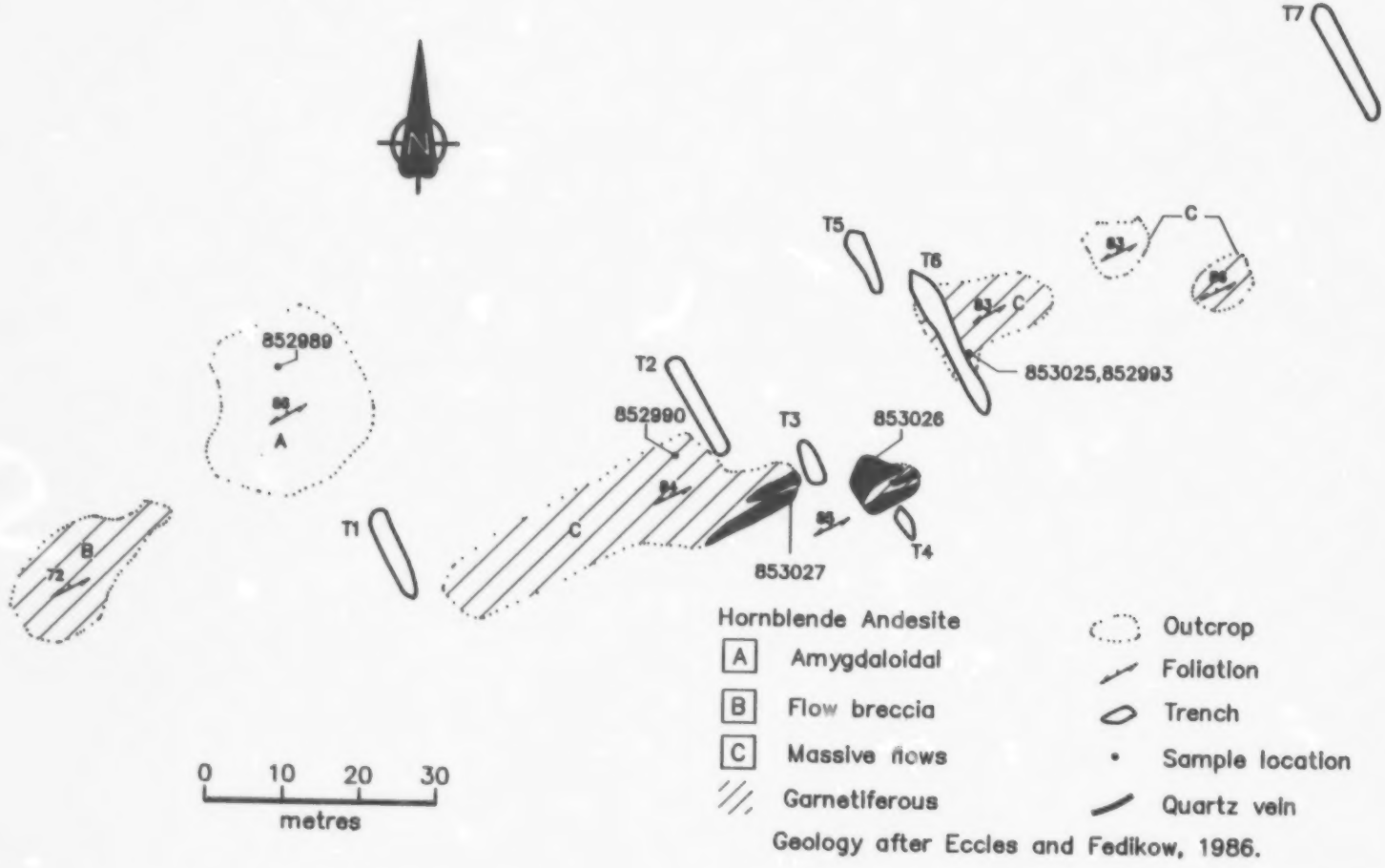


*Figure 20-3: Outcrop distribution, geology, trench and sample locations at occurrence 20.*

**LOCATION: 21**

**NAME: WOOSEY LAKE**
**UTM: 6070652N/418740E**
**ACCESS: Bush aircraft.**

**AREA: Southwest Woosey Lake**
**AIRPHOTO: A26366-131**

EXPLORATION SUMMARY:

Occurrence 21 was first staked in 1953 by William Uhrich; the claim was cancelled in 1955. In 1955 the area was staked for North Canada Mines Limited who conducted a geological survey, electromagnetic and magnetometer surveys and drilled six holes totalling 795 m (A.F. 90022). The drilling program outlined a pyrrhotite-pyrite-graphite zone about 30 m wide and more than 790 m long. The claim was cancelled in 1959. HBED conducted an electromagnetic survey and drilled five holes (total of 387 m) in 1965 (A.F. 90201). Granges Exploration Aktiebolag drilled five holes to test electromagnetic conductors in 1975 (A.F. 91847) and have held the ground since 1985 as claim Klx 18.

GEOLOGICAL SETTING:

The general area of occurrence 21 is underlain by argillite and other epiclastic sedimentary rocks that contain graphitic chemical sedimentary layers. Mafic volcanic rocks occur to the east of the occurrence at Morgan Lake. The supracrustal rocks have been assigned to the Amisk Group. Post-Amisk felsic and mafic intrusions occur in the area (Fig. 21-1). Occurrence 21 outcrops on two islands that expose strongly foliated, rusty weathered and locally silicified argillite and greywacke. The foliation is oriented north-northwest with vertical to near vertical dips. Thin discontinuous quartz-carbonate veins occur sporadically.

MINERALIZATION:

Outcrops on the eastern island contain finely disseminated 1-2% pyrite. Silicified argillite is interlayered with finely laminated graphite-pyrite-pyrrhotite layers. Eccles and Fedikow (1985) observed the mineralized zone over a width of 20 m.

Drilling conducted by North Canada Mines and Granges Exploration intersected disseminated to near solid pyrite-pyrrhotite-graphite with rare chalcopyrite and sphalerite (A.F. 90022, 91847).

GEOCHEMICAL DATA:

Three samples collected for geochemical analysis from old trenches and silicified quartzite contain maximum contents as follows: Zn - 4410 ppm, Cu - 313 ppm, Au - 124 ppb, Mo - 25 ppm, Ni - 178 ppm, and Ag - 2.1 ppm (Appendix I).

Maximum values for drill core assays from North Canada Mines' drilling yielded the following: 3.4 g/t Au, 4.8 g/t Ag, 0.19% Cu, nil Zn, Pb, Ni and Co (A.F. 90022). Similarly, assays of Granges' drill core indicated poor Au, Ag, Cu and Zn values, but one hole intersected a 1.3 m section that contained 0.77% Zn and 0.04% Cu.

CLASSIFICATION:

Chemical sediment-type deposit; sulphide facies iron formation. Finely laminated sulphide-graphite zone interlayered with siliceous argillite.

REFERENCES:


Assessment Files 90022, 90201, 91847
Manitoba Energy and Mines, Minerals Division.

Eccles, D.R. and Fedikow, M.A.F.
1985: Mineral occurrence documentation and alteration zone mapping, Snow Lake area; in Manitoba Energy and Mines, Report of Field Activities 1985, p. 82-99.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping Lakes area, Manitoba; Geological Survey of Canada, Memoir 250, p. 81.

Mineral Inventory Card 63K/16SE Cu3
Manitoba Energy and Mines, Minerals Division.

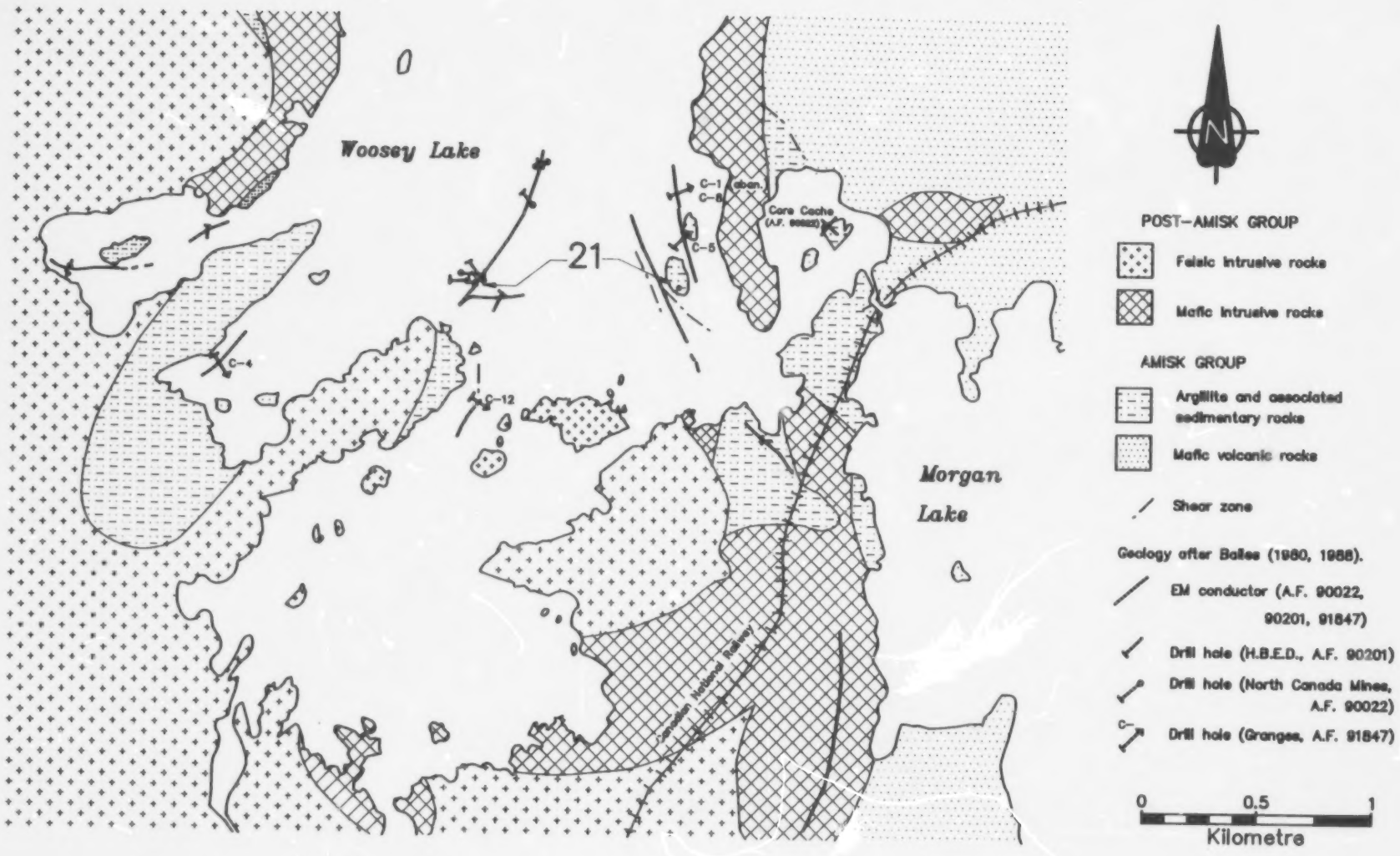


*Figure 21-1: Geological setting of occurrence 21*

**LOCATION: 22**

**NAME: MORGAN LAKE AU; FINLAYSON 'FIND'**
**UTM: 6068858N/421843E**
**ACCESS: Bush aircraft, winter drill roads.**

**AREA: Island in south Morgan Lake**
**AIRPHOTO: A26367-14**

EXPLORATION SUMMARY:

The Morgan Lake Au occurrence was originally staked as the Dot 5 claim by D. Finlayson in 1944; interests in the claim were transferred to C. Riley later in 1944. Twenty trenches and 1273 m of diamond drilling were undertaken in 1945 (logs unavailable). The Dot 5 was leased by Pioneer Gold Mines and Northern Canada Mines Limited from 1952 to 1971, with interests transferred to N. Beaton in 1953 and Tern Lake Mines Limited in 1958. W. Bruce Dunlop, the current owner, staked the area in 1971. HBED optioned the ground from 1978 to 1983 and carried out an EM survey and a 12 hole diamond drill program. Granges Exploration Limited has optioned the property since 1984. Granges discovered the Morgan Lake Zn deposit during a diamond drill program located southwest of the island (see occurrence 23, this report).

GEOLOGICAL SETTING:

Amisk Group mafic volcanic fragmental and massive flows are the predominant lithologies throughout the Morgan Lake area (Fig. 22-1) and are characterized by numerous zones of silicification and Fe-Mg metasomatism. The western portion of the Morgan Lake area contains post-Amisk felsic and mafic intrusions. At the occurrence epidotized, garnetiferous and rusty-weathered fragmental basalt forms the host rocks. The Kobar Lake Fault is mapped approximately 0.3 km to the east of the occurrence.

MINERALIZATION:

A set of parallel white quartz veins, 8-15 cm thick that trend north-south outcrop on the southern tip of the island. These "southern" veins are iron stained and contain basaltic wall rock inclusions. A second set of quartz veins occurs further north, about 10-15 m from the shoreline (Fig. 22-2). Harrison (1949) describes these veins as narrow lenses and stringers comprising a zone 240 m in length and 0.6-0.9 m wide that thins to the south. The mineralized zone crosscuts pyrite-bearing wall rock. These quartz veins contain abundant pyrite, chalcopyrite, sphalerite, and galena. The pyritic wall rocks contain minor amounts of sulphide minerals and gold and may represent a distinct, earlier phase of mineralization or a sulphide halo about the vein.

GEOCHEMICAL DATA:

Three samples were collected for analysis. Assay data for these samples is presented in Table 22-1. Multi-element geochemical data for sample 853866 from the polymetallic quartz veins is presented in Appendix I. Data from the "southern veins" (sample 853867) contains low base metal abundances with 0.68 g/t Au and 2 g/t Ag whereas the polymetallic veins are markedly enriched in Au (37-169 g/t), Ag (46-174 g/t), Zn (0.29-0.58%) and Cu (286-376 ppm).

Harrison (1949) notes early drilling results reporting 19.2 g/t Au over a 0.7 m average width for one shoot and 47.3 g/t Au over a 0.6 m average width for a second shoot.

CLASSIFICATION:

Vein-type deposit. Auriferous quartz veins in mafic volcanic rocks. The veins and sulphide mineralization including gold and silver may represent mobilizate from the nearby Morgan Lake Zn deposit.

REFERENCES:


Assessment File 90201
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1987: Chisel-Morgan lakes; Manitoba Energy and Mines, Preliminary Map 1987S-1, Scale 1:15 840.

Eccles, D.R. and Fedikow, M.A.F.
1985: Mineral occurrence documentation and alteration zone mapping, Snow Lake area; in Manitoba Energy and Mines, Report of Field Activities 1985, p. 92-100.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping Lakes area, Manitoba; Geological Survey of Canada, Memoir 250, p. 64-66.

Mineral Inventory Card 63K/16SE Au6
Manitoba Energy and Mines, Minerals Division.

**Table 22-1: Geochemical analysis of samples from Occurrence 22**

| Sample No. | Lab No. | Rock Type | Au g/t | Ag g/t | Zn %* | Cu ppm | Ni ppm | Pb ppm |
|---|---|---|---|---|---|---|---|---|
| 00743 | 853867 | quartz vein; southern set | 0.7 | 2 | 90 ppm | 102 | 10 | 2 |
| 00744 | 853875 | quartz vein; trench muck | 37.0 | 46.3 | 0.29 | 286 | 10 | 15 |
| 00745 | 853866 | quartz vein; trench muck | 149.1 | 174.2 | 0.58 | 376 | 13 | 20 |

*unless otherwise specified

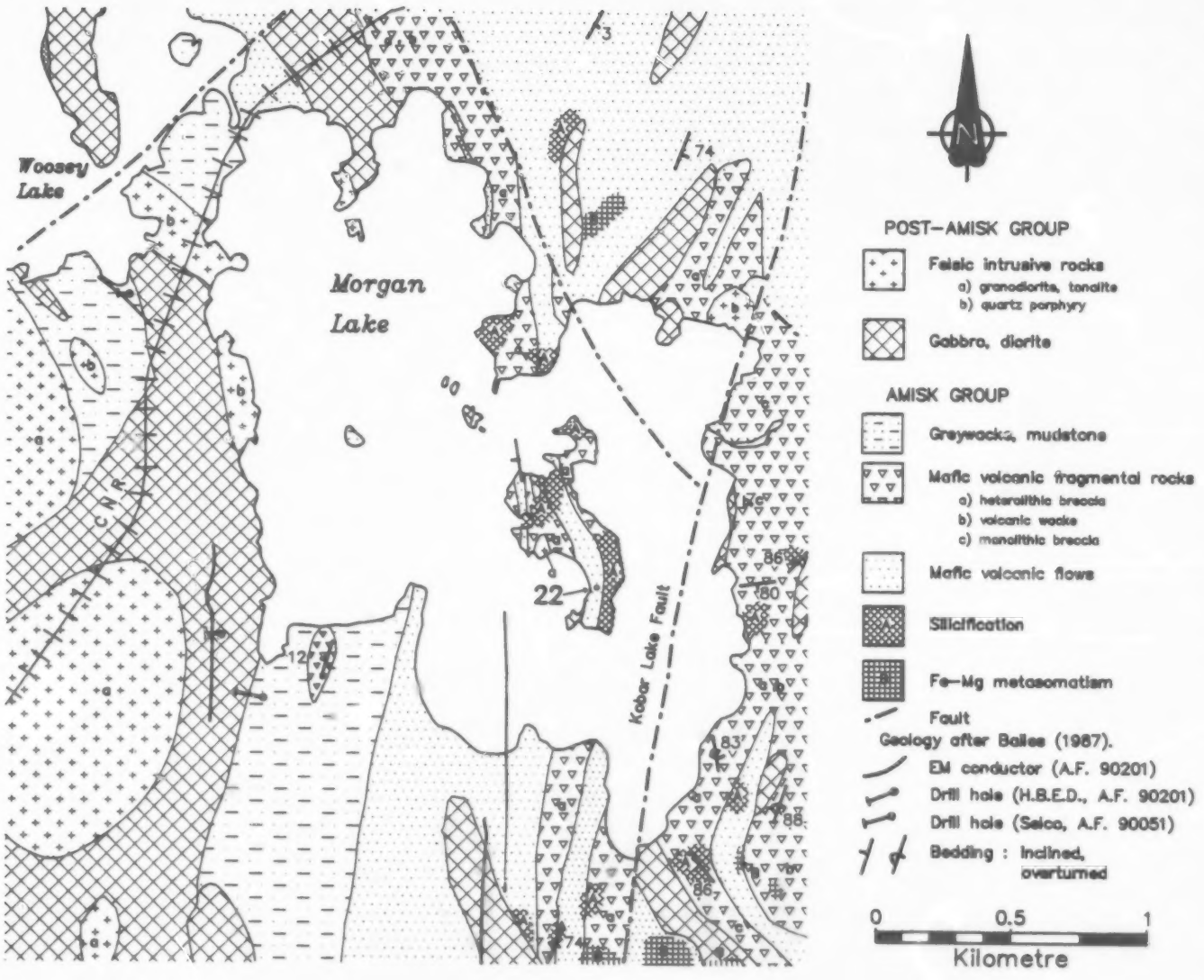


*Figure 22-1: Geological setting of occurrence 22*

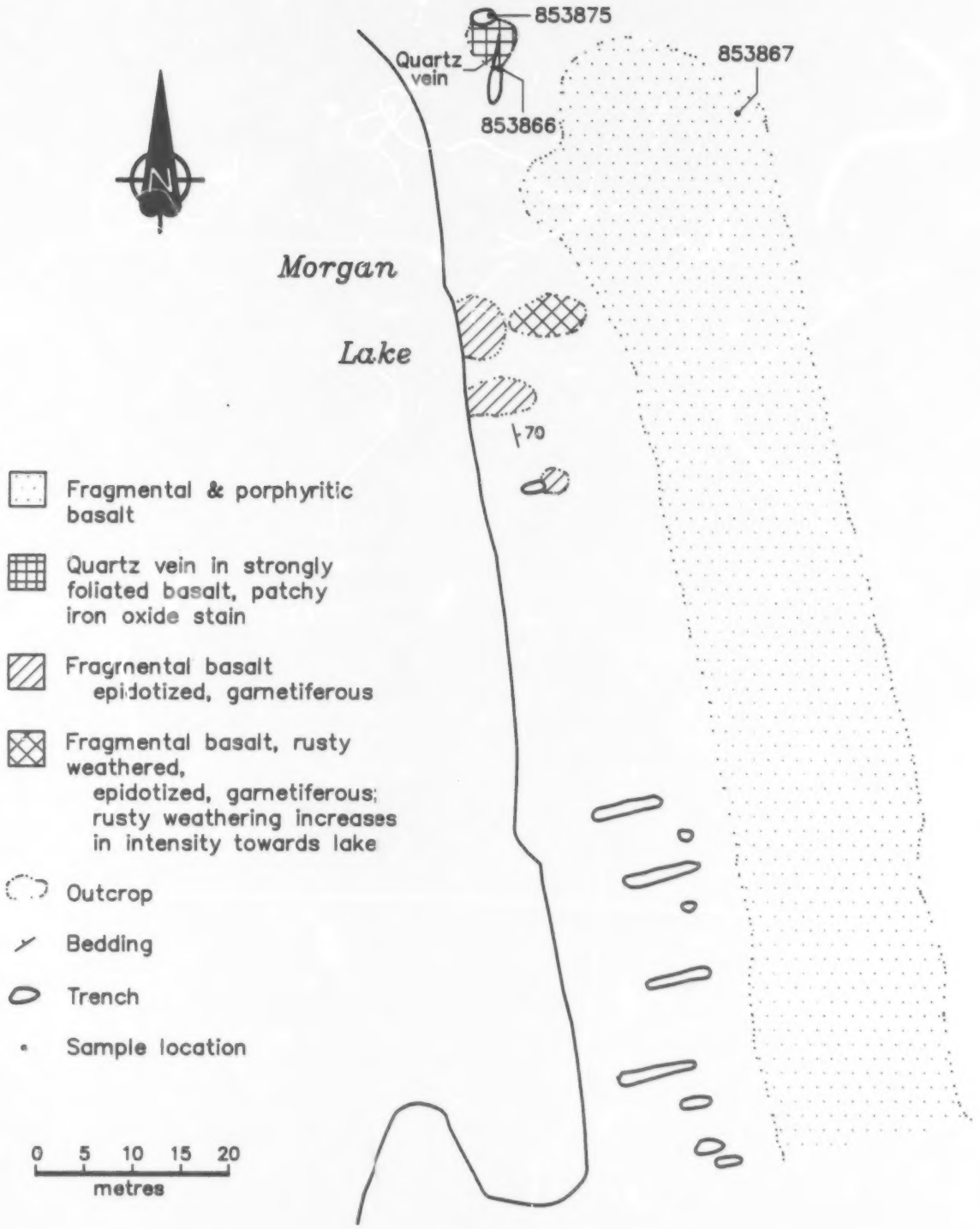


*Figure 22-2: Outcrop distribution, geology, trench and sample locations at occurrence 22.*

**LOCATION: 23**

NAME: MORGAN LAKE ZN DEPOSIT
UTM: 6068660N/421678E
ACCESS: Bush aircraft.

AREA: Southwest of island in south Morgan Lake
AIRPHOTO: A26367-14

EXPLORATION SUMMARY:

Occurrence 23 was first staked as part of the Dot 5 claim by D. Finlayson in 1944; interests in the claim were transferred to C. Riley later in 1944. Twenty trenches and 1273 m of diamond drilling were recorded on the claim in 1945. This work was conducted on the nearby Morgan Lake Au occurrence and records are unavailable. The Dot 5 claim was leased by Pioneer Gold Mines and Northern Canada Mines Limited from 1952 to 1971, with interests transferred to N. Beaton in 1953 and Tern Lake Mines Limited in 1958. W. Bruce Dunlop, the current owner, staked the area in 1971. HBED optioned the ground from 1978 to 1983 and carried out an EM survey and a 12 hole diamond drill program. Granges Exploration Limited optioned the property in 1984. The same year geophysical surveys and diamond drilling were performed. A mineralized zone that contains 15.9% Zn over a 7.6 m width (12 m core length) was intersected during the drill program (Mineral Inventory Card 63K/16SE Zn7). Drill indicated reserve estimates are 272,000 tonnes grading 15% Zn and 3.42 g/t Au (E. Fluskey, pers. comm., 1988).

GEOLOGICAL SETTING:

The general area of occurrence 23 is underlain by a sequence of west-facing heterolithic mafic volcaniclastic rocks (Fig. 23-1). The mineralization occurs approximately 300 m stratigraphically below the base of a paraconglomerate and greywacke unit (the Amisk Group Parisian Formation - Bailes, 1986). The volcaniclastic sequence consists of heterolithic mafic volcaniclastic breccia, mafic volcanic wacke and minor associated mafic flows and felsic tuff; the sequence has been intruded by diorite and granodiorite (op. cit., 1986). Pervasive silicification with minor epidotization and Fe-Mg metasomatism are common. The Morgan Lake Zn deposit is hosted by felsic to intermediate tuff that grades to sericite schist (E. Fluskey, pers. comm.).

MINERALIZATION:

Two convergent zones of mineralization comprise the Morgan Lake Zn deposit:

1) primary banded sphalerite and pyrite in sericite schist; and

2) a footwall assemblage of sphalerite, pyrrhotite, pyrite, chalcopyrite and rare galena that crosscuts stratigraphy and is interpreted to represent the alteration pipe to the massive sulphide deposit. The deposit is oriented NE-SW, plunges north, has a short strike length and is 3-4.6 m wide. The mineralization is apparently cut off by a granite body on the north (op. cit.)

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Massive sulphide-type deposit. Stratabound base metal and iron sulphide-gold mineralization in an altered zone of felsic to intermediate volcanic rocks.

REFERENCES:

Bailes, A.H.
1987 Chisel-Morgan lakes; Manitoba Energy and Mines, Preliminary Map 1987S-1, Scale 1:15 840.

Bailes, A.H.
1986: Chisel-Morgan lakes project; in Manitoba Energy and Mines, Report of Field Activities 1986, p. 71-76.

Mineral Inventory Card 63K/16SE Zn7
Manitoba Energy and Mines, Minerals Division.

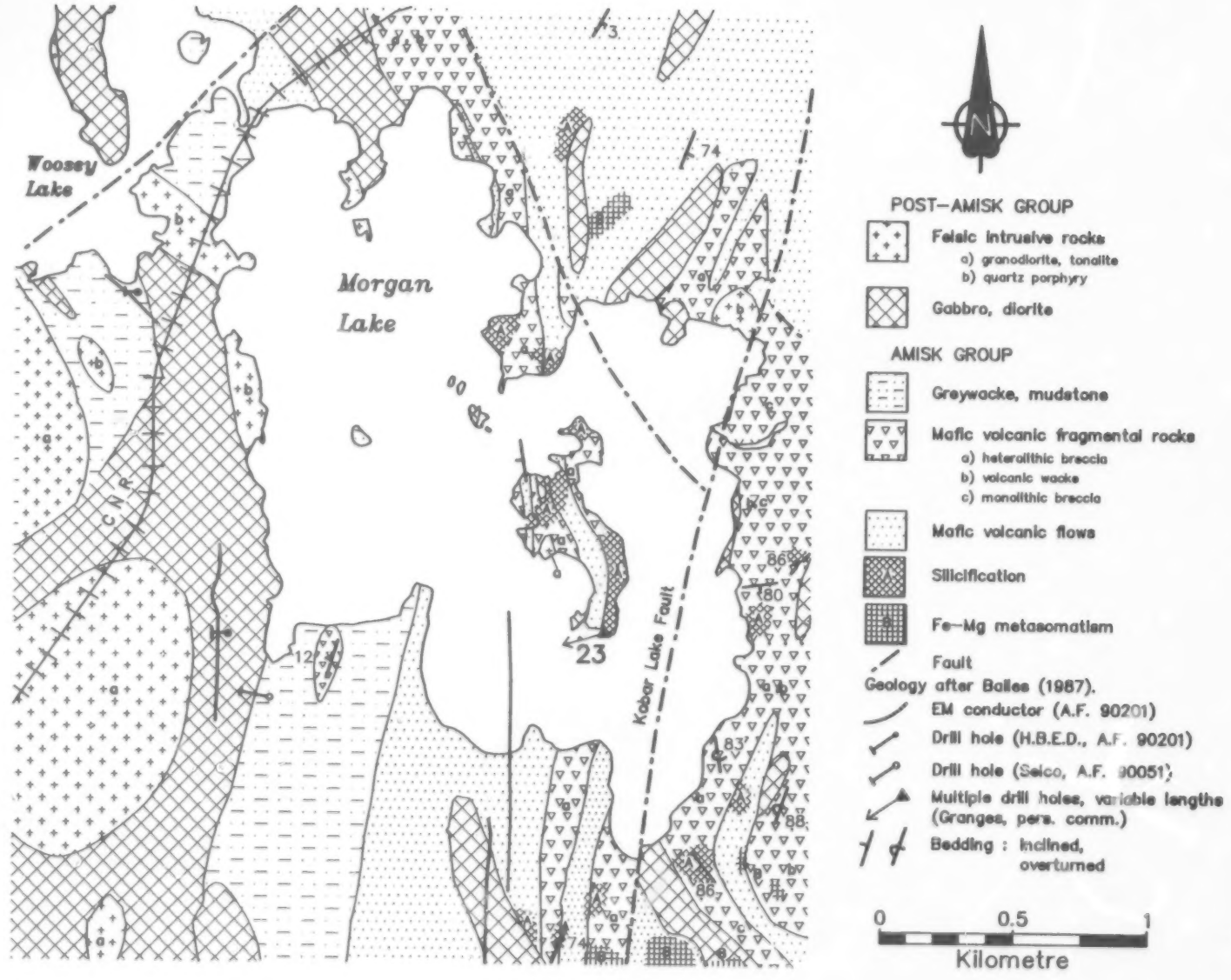


*Figure 23-1: Geological setting of occurrence 23*

**LOCATION: 24**

NAME: BOMBER ZONE; COOK LAKE
UTM: 6078984N/423998E
ACCESS: Bush aircraft.

AREA: Southwest shore of Cook Lake
AIRPHOTO: A26366-152

EXPLORATION SUMMARY:

Occurrence 24 was first recorded as the Subore 14 claim in 1945 by R.G. Thompson, who assigned it to the Chisel Lake Mining Syndicate later that year. The claim was cancelled in 1948. The Bomber 6 claim was recorded by G. Richard in 1954, assigned to R. Crosby in 1955, optioned by HBED in 1955 and cancelled in 1960. HBED drilled about 13 holes, outlining a sulphide lens/layer with indeterminate tonnage grading 0.1 g/t Au, 8.6 g/t Ag, 0.04% Cu and 1.0% Zn. The sulphide lens/layer has a known strike length of 550 m, is 1.8 m wide, and 240 m in depth (A.F. 90018; Mineral Inventory Card 63K/16NE Zn3). L. Lecoy staked the area in 1968 as the Ef claims, transferring ownership to Falconbridge Nickel Mines Limited in 1969. Falconbridge Limited, the current owners, have conducted ground and airborne magnetometer surveys, geological surveys, and diamond drilling on the property (Mineral Inventory Card 63K/16SE Zn3).

GEOLOGICAL SETTING:

The general area of occurrence 24 is underlain by felsic volcanic rocks of the Amisk Group. At the occurrence the host rocks to the mineralization are rusty weathered, silicified, bleached, quartz- and plagioclase-phyric and aphyric felsic volcanic rocks (Fig. 24-1). Jackson (1983) describes five major stratigraphic subdivisions in the area, from oldest to youngest these are: 1) mafic flows; 2) felsic volcaniclastic rocks that host the altered and mineralized zones; 3) felsic fragmental rocks and flows; 4) a marker unit of mafic flows and tuff; and 5) a mixed unit of mafic and felsic fragmental and flow rocks. Bailes (1987a) observed stratigraphic similarities between the rocks at Cook Lake and those north of Chisel Lake and concluded that both areas are probably lateral facies equivalents of the stratigraphy exposed near the Chisel Lake deposit (cf. Gale and Koo, 1977, p. 48). Silicification and minor epidotization are common throughout the Cook Lake area.

MINERALIZATION:

Bedrock exposure of the occurrence is limited to a single rusty weathered trench in quartz-phyric felsic volcanic rocks (also described as banded exhalative chert by Jackson, 1983) containing up to 25% disseminated pyrite. The altered, rusty weathered felsic rocks have a strike of 020°/65°E and plunge north. Basalt located nearby is rusty weathered but does not contain visible sulphide mineralization. The mineralized zone is hosted by a concordant Al-silicate-bearing alteration zone.

Based on drill results, HBED described granular, fine- to medium-grained pyrite, pyrrhotite, sphalerite and chalcopyrite that form a tabular body 550 m long, 1.8 m wide and 240 m deep that has a strike of 020°/90° (Mineral Inventory Card 63K/16SE Zn3).

Jackson (1983) describes well defined, stratiform, discontinuous bands/lenses with up to 30% subhedral to euhedral pyrite with lesser anhedral pyrrhotite, magnetite, chalcopyrite and rare sphalerite. The Bomber zone has a weak metal zonation in which Cu/Zn increases with depth.

GEOCHEMICAL DATA:

One sample collected from trench muck assayed tr Au, 2 ppm Ag, 166 ppm Cu, 10 ppm Ni, 841 ppm Zn and 320 ppm Pb. Jackson (1983) states that the highest assays from drill core from this zone were 0.04% Cu, 1.3% Zn, tr Au, and 10.2 g/t Ag over 3.4 m width. Jackson (1983) also presents detailed geochemical analyses of rocks from the Cook Lake area and associated mineralization.

CLASSIFICATION:

Massive sulphide-type Zn-Cu mineralization associated with altered felsic volcanic rocks.

REFERENCES:


Assessment File 90018
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1987a: Chisel-Morgan lakes project; in Manitoba Energy and Mines, Report of Field Activities 1987, p. 71-79.

Bailes, A. H.
1987b: Chisel-Morgan lakes; Manitoba Energy and Mines, Preliminary Map 1987S-1, Scale 1:15 840.

Davies, J.F., Bannatyne, B.B., Barry, G.S., and McCabe, H.R.
1962: Geology and mineral resources of Manitoba; Manitoba Mines Branch Special Publication, p. 85.

Eccles, D.R. and Fedikow, M.A.F.
1985: Mineral occurrence documentation and alteration zone mapping, Snow Lake area; in Manitoba Energy and Mines, Report of Field Activities 1985, p. 82-100.

*Figure 24-1: Geological setting of occurrence 24*

Gale, G.H. and Koo, J.

1977: Evaluation of massive sulphide environments; Canada-Manitoba Non-Renewable Resource Evaluation Program, 2nd Annual Report 1976-1977, p. 43-62.

Harrison, J.M.

1949: Geology and mineral deposits of File-Tramping Lakes area, Manitoba; Geological Survey of Canada, Memoir 250, p. 53.

Jackson, A.R.

1983: Volcanism and genesis of Cu-Zn mineralization at Cook Lake, Snow Lake greenstone belt, Manitoba; M.Sc. thesis (unpublished), University of Western Ontario, 155 p.

Mineral Inventory Card 63K/16SE Zn3

Manitoba Energy and Mines, Minerals Division.

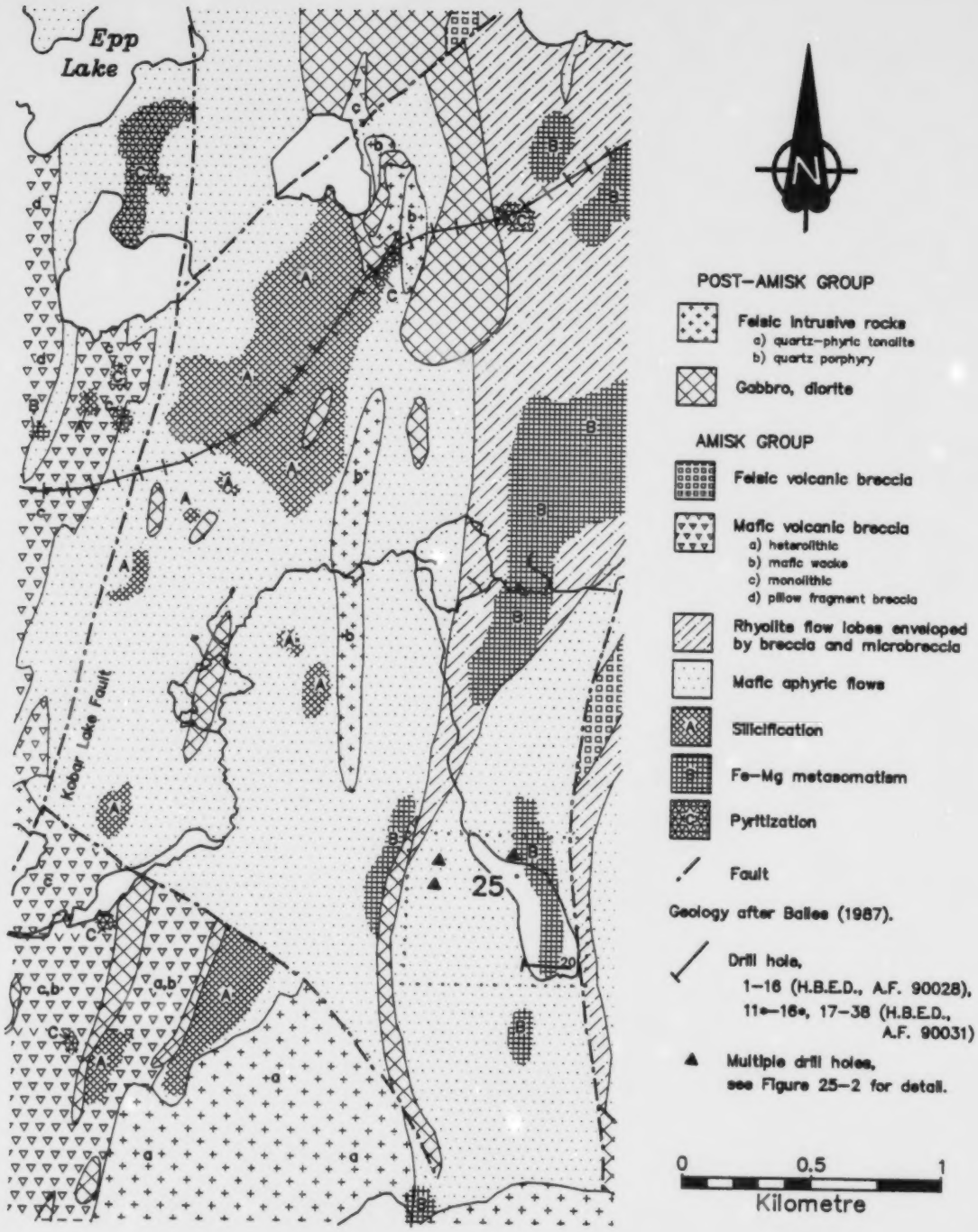


*Figure 25-1: Geological setting of occurrence 25*

**LOCATION: 25**

NAME: POT LAKE Zn-Cu DEPOSIT

UTM: 6069632N/424301E
ACCESS: Winter roads.

AREA: North Hirst Lake, 2.4 km east of the north end of Morgan Lake
AIRPHOTO: A16366-159

EXPLORATION SUMMARY:

The area around occurrence 25 was initially recorded as two claims, the DR 12 and the JB 14. DR 12 was staked by M. Hale in 1945, transferred to W. Johnson in 1947 and cancelled in 1953. The JB 14 was recorded by W. Johnson in 1947 and cancelled in 1949. HBED optioned the area in 1954 as part of the Pot group of claims staked by G.R. Mitchell. HBED conducted EM and magnetometer surveys and diamond drilling in the area. They outlined 123 000 tonnes of mineralization grading 4.5% Zn, 1.43% Cu, 0.4 g/t Au, 18.0 g/t Ag (Mineral Inventory Card 63K/16SE Zn4) (Fig. 25-1, 2). The deposit is currently (1988) controlled by HBED.

GEOLOGICAL SETTING:

The Pot deposit occurs within Amisk Group subaqueous aphyric to sparsely pyroxene-phyric pillowed mafic flows (Fig. 25-1). These flows form a west-facing unit with a total thickness of 3300 m and occur approximately 4 km stratigraphically below the units that host the Chisel, Lost and Ghost massive sulphide deposits (Bailes, 1986). This unit is overlain by successive units of: 1) felsic volcanic breccia and wacke; 2) subaqueous mafic flows; 3) mixed mafic and felsic volcanic breccia and wacke; 4) felsic fragmental rocks; and 5) mafic wacke and tuff (Bailes, 1986; Bailes et al., 1987). Fe-Mg metasomatic alteration, marked by the mineral assemblage garnet + chlorite ± biotite ± amphibole occurs locally.

MINERALIZATION:

Harrison (1949) briefly mentions poorly exposed pyrite-bearing, rusty weathering, garnetiferous, altered mafic volcanic rocks that contain veins, stringers and irregular masses of quartz. Coarse- and fine-grained pyrite are present; chalcopyrite is rare.

Drilling by HBED (A.F. 90029, 90031) intersected chlorite schist, in part garnetiferous and/or silicified, containing pyrite, pyrrhotite, chalcopyrite, sphalerite and less commonly magnetite. The sulphide mineralization observed in drill core range from minor disseminations to stringers, bands, and near solid sections. Mineralized zones and the locations of diamond drill holes in the immediate area are presented in Figure 25-2.

GEOCHEMICAL DATA:

None available.

CLASSIFICATION:

Massive sulphide-type Zn-Cu mineralization associated with altered mafic volcanic rocks.

REFERENCES:


Assessment File 90029, 90031, 91927
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1987: Chisel-Morgan lakes; Manitoba Energy and Mines, Preliminary Map 1987S-1, Scale 1:15 840.

Bailes, A.H.
1986: Chisel-Morgan lakes project; in Manitoba Energy and Mines, Report of Field Activities 1986, p. 71-76.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping Lakes area, Manitoba; Geological Survey of Canada, Memoir 250, p. 66.

Mineral Inventory Card 63K/16SE Zn4
Manitoba Energy and Mines, Minerals Division.

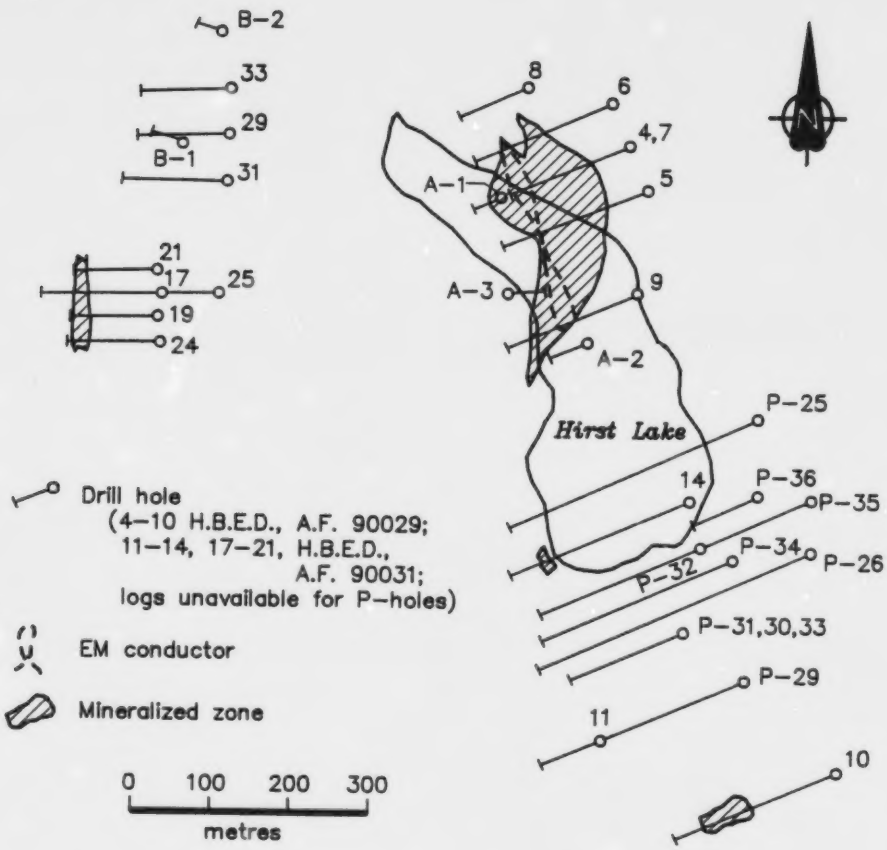


*Figure 25-2: Drill hole and mineralized zone locations at occurrence 25.*

**LOCATION: 26**

NAME: BERRY CREEK
UTM: 6072304N/433987E
ACCESS: Bush road and traverse leading from Provincial Hwy. 392 west of Berry Creek bridge.

AREA: 400 m north of Berry Lake along Berry Creek
AIRPHOTO: A26366-210

EXPLORATION SUMMARY:

The Maple group of claims was staked in 1929 by W.A. MacRae, transferred to P. Kobar in 1930 and cancelled later in 1930. Trenching was done by Manitoba Basin Mines Limited during that time. L. M. Grant held the ground from 1946 to 1948. G.J. Kobar recorded the Zum claims in 1952, and drilled five holes totalling 550 m; there is no mention of mineralization in the logs (A.F. 90063). Five more holes totalling 198 m were drilled slightly south of the previous drilling by W. Johnson in 1953 (A.F. 90052). The claims were transferred to P. Kobar in 1956 and optioned to HBED later that year. HBED conducted an EM survey and drilled a minimum of 14 holes for a total of 2117 m (A.F. 90021, 90032, 90058, 90060). HBED gave up its option in 1957 and the claim lapsed in 1960. Several parties later controlled the ground: I. Gorowski (1962-63), P. Stoltz (1964-65) and A. Kobar (1968-76). Falconbridge Nickel Mines Limited conducted airborne geophysical surveys in the area in 1970 (A.F. 90023). Part of the area was covered by claims belonging to A.C. Borgstrom from 1973 to 1978, and part by Granges Exploration Aktiebolag from 1976 to 1979. Six drill holes in the Berry Creek area totalling 337 m were drilled by Granges from 1976 to 1979 (A.F. 92104, 92105, 92196). W. Bruce Dunlop Ltd. staked the ground in 1980, transferred interests to Noranda Exploration Company Limited from 1981 to 1982, but the claims were cancelled again in 1984. In 1985, part of the area was restaked by W. Bruce Dunlop Ltd. whose interests were transferred to Granges Exploration Ltd. Granges has controlled the claims in the area since 1986.

GEOLOGICAL SETTING:

The general area of occurrence 26 is underlain by mafic volcanic rocks flanked to the north by quartz-eye tonalite and to the south by granodiorite (Fig. 26-1). The mafic volcanic rocks and the tonalite have been assigned to the Amisk Group. The Berry Creek Fault has been mapped approximately 0.75 km south of the occurrence. The mafic volcanic rocks at the occurrence are carbonatized, locally brecciated and/or silicified and intruded by porphyritic diorite dykes. The Berry Creek occurrence is hosted by porphyritic and fine grained aphyric intermediate to mafic volcanic rocks (Fig. 26-1). In mineralized sections, the andesite grades to chlorite schist. Numerous small, shallow dipping quartz veins and stringers are present.

MINERALIZATION:

Disseminated (maximum 10%) pyrrhotite, pyrite and chalcopyrite occur in silicified mafic volcanic rocks. The mafic volcanic rocks commonly grade to chlorite schist in drill indicated mineralized zones. Harrison (1949) noted muck near an old trench contained "a large proportion" of sphalerite, "less" galena and "minor" chalcopyrite. In drill core, mineralization commonly occurs as solid sulphide bands and as disseminated small blebs and fine grains of sulphide in zones up to 3 m in core length. Numerous small, shallow dipping quartz veins and stringers are present. Wright (1930) and Harrison (1949) describe discontinuous irregularly shaped minor shear zones up to 2.4 m wide that have a strike of 055o and a steep to vertical dip. Mineralization within the shear zones is not uniformly distributed.

GEOCHEMICAL DATA:

Six samples were collected for geochemical analysis (Fig. 26-1, -2; Appendix I). Cu contents ranged from 64 to 231 ppm; values for Au, Ag, Zn, Ni and Pb are low.

Wright (1930) described early trench samples containing "some Ni" and "a small amount" of Au and Cu. Assays included with drill logs (A.F. 92105) range as follows: 0.03-0.10 g/t Au, 3.4-4.1 g/t Ag, 0.01-0.28% Cu and 0.01-0.64% Zn.

CLASSIFICATION:

Massive sulphide-type Zn-Cu mineralization in altered mafic volcanic rocks.

REFERENCES:

Assessment Files 90021, 90023, 90032, 90052, 90058, 90060, 90063, 92104, 92105, 92196
Manitoba Energy and Mines, Minerals Division.

Fedikow, M.A.F., Roney, C.T., Schmidt, G.J. and Robbie, T.J.
1986: Mineral deposit studies in the Snow Lake area; in Manitoba Energy and Mines, Report of Field Activities 1986, p. 77-86.

Froese, E. and Moore, J.M.
1980: Metamorphism in the Snow Lake area, Manitoba; Geological Survey of Canada, Paper 78-27, 16 p.

Harrison, J.M.

1949: Geology and mineral deposits of File-Tramping Lakes area, Manitoba; Geological Survey of Canada, Memoir 250, p. 52.

Mineral Inventory Card 63K/16NE Ni1
Manitoba Energy and Mines, Minerals Division.

Wright, J.F.

1930: Geology and mineral deposits of a part of northwest Manitoba; Geological Survey of Canada, Summary Report 1930, Part C, p. 109c.

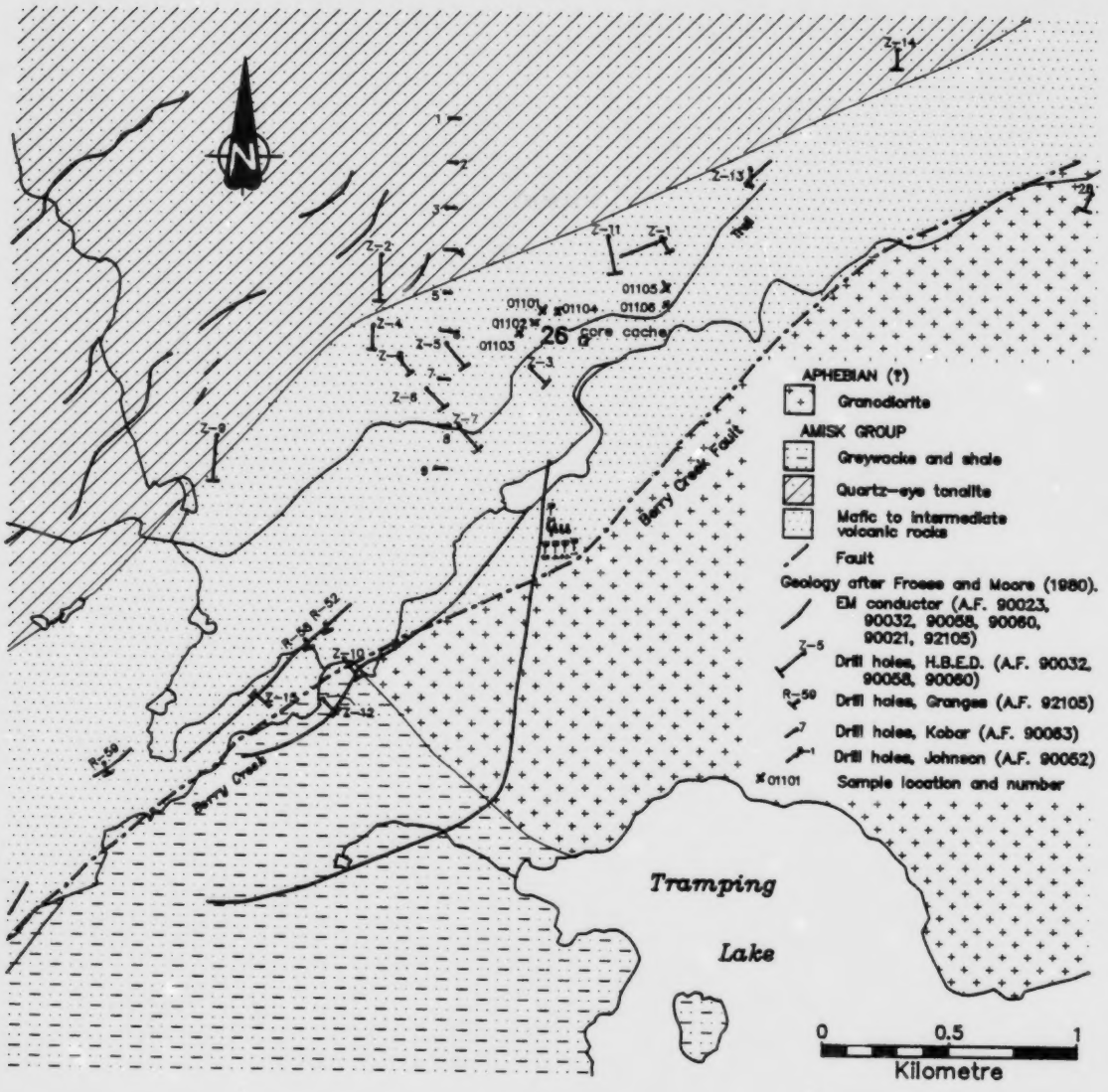


*Figure 26-1: Geological setting of occurrence 26*

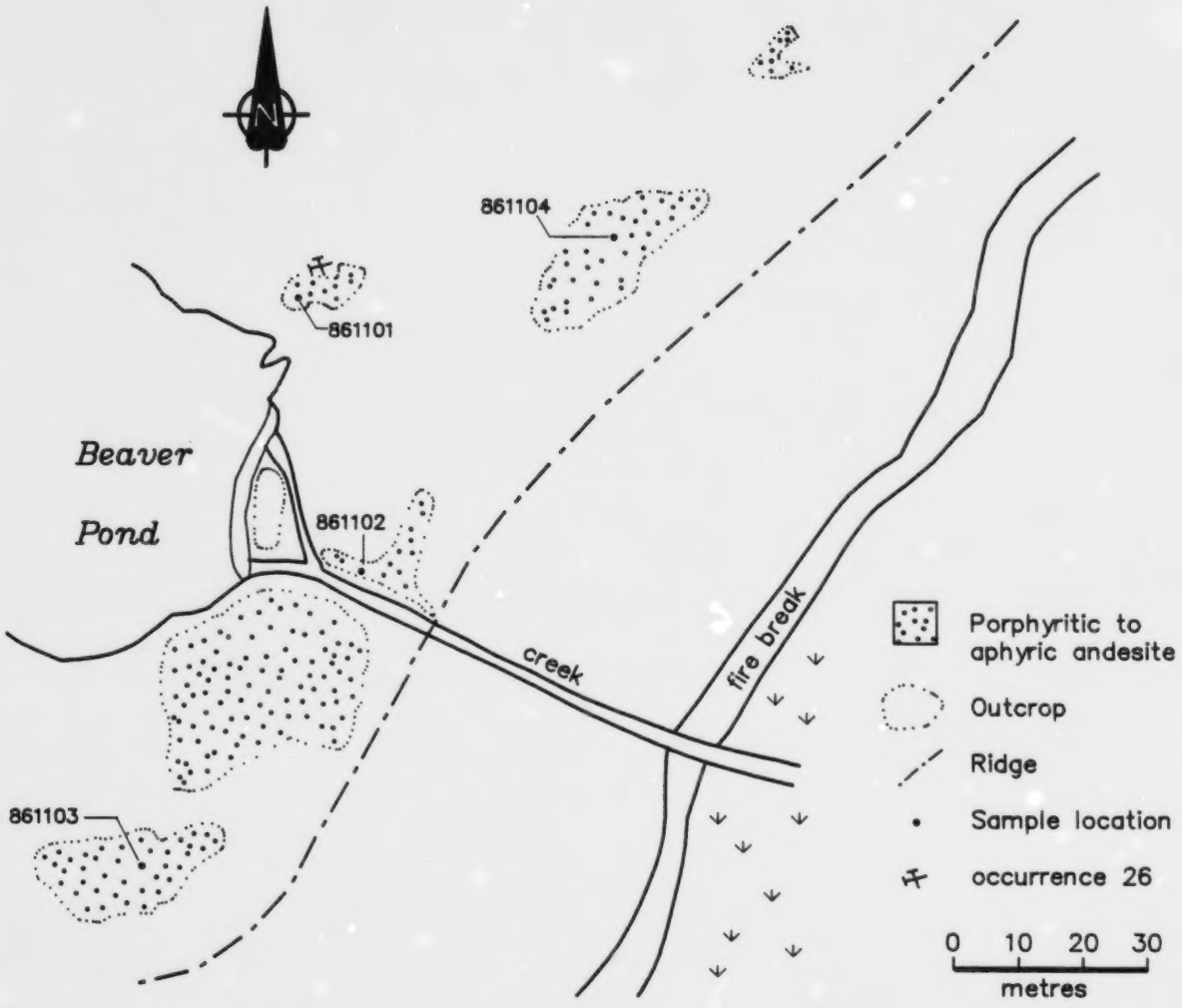


*Figure 26-2: Outcrop distribution, geology and sample locations at occurrence 26.*

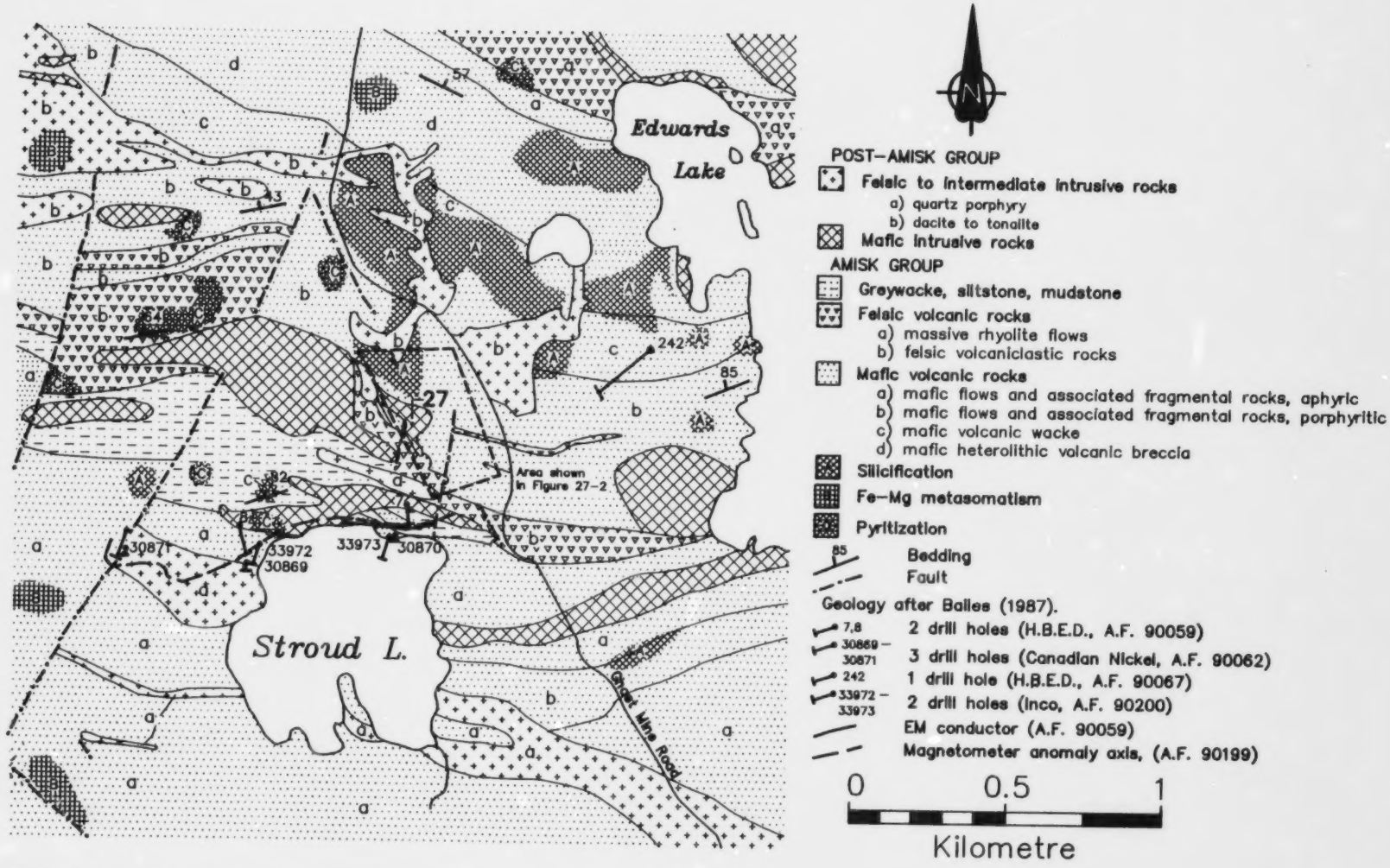


*Figure 27-1: Geological setting of occurrence 27*

**LOCATION:** 27

NAME: EDWARDS LAKE

UTM: 6073502N/428725E

ACCESS: Ghost Mine Road.

AREA: Between Edwards Lake and Stroud (a.k.a. Hub) Lake

AIRPHOTO: A26366-186

EXPLORATION SUMMARY:

The Wow 1 claim was staked by J.H. Kerr in 1942; interests subsequently were transferred to J. Nutt in 1946 and A. Paterson in 1947 before cancellation in 1950. Ox 693 was recorded on behalf of HBED in 1956, and it was grouped with other Ox claims. All interests in Ox 693 were transferred to HBM&S and lease M-7291 was taken out in 1960.

GEOLOGICAL SETTING:

The general area of occurrence 27 forms part of a geologically complex area containing north-facing Amisk Group mafic flows, fragmental rocks and heterolithic breccia, felsic flows and volcaniclastic rocks, greywacke, and mafic and felsic dykes (Fig. 27-1). Silicification, Fe-Mg metasomatism, pyritization and epidotization are common in the Edwards-Stroud lakes area (Bailes et al., 1987).

Synvolcanic dacite dykes (Fig. 27-1, unit 5b) are synchronous with hydrothermal activity in the Chisel Lake area and are locally associated with extensive silicification (Skirrow, 1987; Bailes, 1987a). The occurrence is hosted by a quartz-eye granite porphyry that is cut by mafic dykes (Fig. 27-2). The quartz-eye granite is greyish-tan, weathers pinkish-brown and is highly siliceous. Bluish 4-8 mm quartz blebs or eyes (5-25%) weather in positive relief. Biotite and muscovite are present in varying amounts, the former concentrated near the mafic dykes. Feldspars give a pink hue to the weathered surface. Numerous rusty weathered quartz veins from 1 mm to 1 m in thickness are present. Two main joint sets are oriented at 220°/55° NW and 265°/90°. The mafic intrusion varies from 10 to 50 cm in width and weathers apple green. Nearby andesite contains abundant biotite, numerous epidote stringers and some small quartz veins.

MINERALIZATION:

Two mineralized sites are associated with occurrence 27 (Fig. 27-2). One site contains disseminated (maximum 6%) pyrite and chalcopyrite associated with white quartz veins in a fine grained mafic dyke that intrudes quartz-eye granite. Five trenches were blasted at this occurrence. The second site is represented by disseminated (5-7%) pyrite and pyrrhotite in a rusty weathered greywacke.

GEOCHEMICAL DATA:

Eight samples were collected from the first site. These samples contain a wide range of concentrations for Au (4-9000 ppb) and Zn (4-839 ppm). The two samples with the highest visual estimate of sulphide mineralization (861121 and 861123) contained the most Au, i.e., 2820 and 6650 ppb, respectively. Samples 861119, 861123, 861124 and 861125 contained a range of 102-420 ppm W, apparently confirming earlier reports of scheelite associated with quartz veins from the area (Harrison, 1949). A single sample (861501) collected from the second mineralized site at occurrence 27 contained low Cu, Pb, Zn, Au, Ag and W (Appendix I). Skirrow (1987) presents geochemical data on rocks and associated alteration within the strata in the Edwards Lake area.

CLASSIFICATION:

Vein type deposit. Sulphide-bearing quartz veins with associated scheelite in a mafic dyke that intrudes a granite.

REFERENCES:


Bailes, A.H.

1987a: Chisel-Morgan lakes project; in Manitoba Energy and Mines, Report of Field Activities 1987, p. 70-79.

Bailes, A. H.

1987b: Chisel-Morgan lakes; Manitoba Energy and Mines, Preliminary Map 1987S-1, Scale 1:15 840.

Bailes, A.H., Syme, E.C., Galley, A., Price, D.P., Skirrow, R. and Ziehlke, D.J.

1987: Early Proterozoic volcanism, hydrothermal activity, and associated ore deposits at Flin Flon and Snow Lake, Manitoba; Geological Association of Canada, Field Trip Guidebook 1, 95 p.

Fedikow, M.A.F., Roney, C.T., Schmidt, G.J. and Robbie, T.J.

1986: Mineral deposit studies in the Snow Lake area; in Manitoba Energy and Mines, Report of Field Activities 1986, p. 77-85.

Froese, E. and Moore, J.M.

1980: Metamorphism in the Snow Lake area, Manitoba; Geological Survey of Canada, Paper 78-27, 16 p.

Harrison, J.M.

1949: Geology and mineral deposits of File-Tramping Lakes area, Manitoba; Geological Survey of Canada, Memoir 250, p. 57.

Mineral Inventory Card 63K/16NE Pyr1

Manitoba Energy and Mines, Minerals Division.

Skirrow, R.G.

1987: Silicification in a semiconformable alteration zone below the Chisel massive sulphide deposit, Manitoba; M.Sc. thesis (unpublished), Carleton University, 171 p.

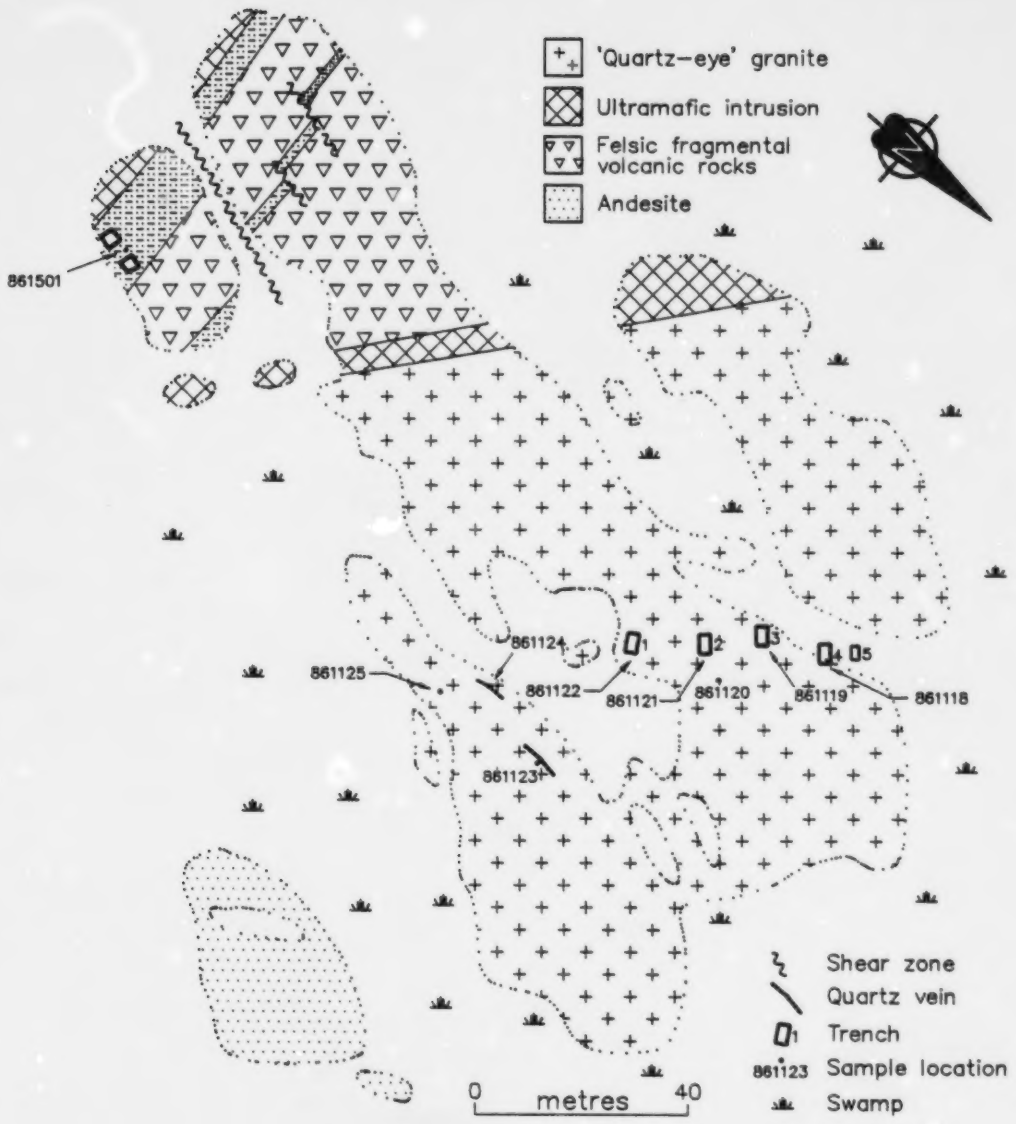


*Figure 27-2: Outcrop distribution, geology, trench and sample locations at occurrence 27.*

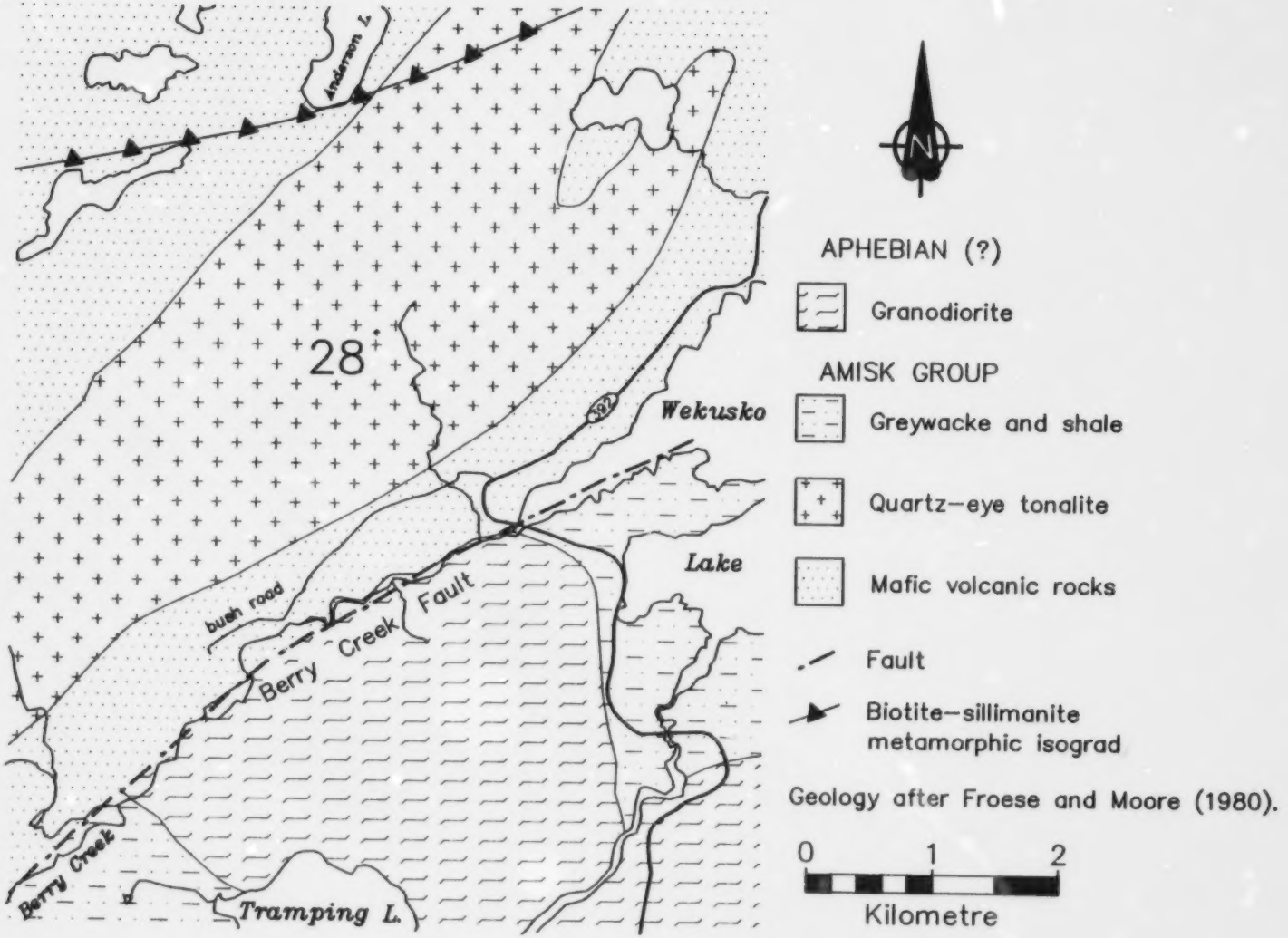


*Figure 28-1: Geological setting of occurrence 28*

**LOCATION:** 28

NAME:

UTM: 6074837N/435335E

ACCESS: Traverse and bush road leading from Provincial Hwy. 392.

AREA: 2 km north of Berry Creek

AIRPHOTO: A26366-208

EXPLORATION SUMMARY:

The Berry 4 claim was staked in 1986 by W. Bruce Dunlop Limited, the current (1988) owner. Interests were transferred in 1987 to Granges Exploration Limited.

GEOLOGICAL SETTING:

The general area of occurrence 28 is underlain by quartz-eye tonalite that is flanked to the northwest by mafic volcanic rocks and to the southeast by mafic volcanic rocks and granodiorite (Fig. 28-1). These rock units have been assigned to the Amisk Group with the exception of the granodiorite intrusion south of the occurrence. Occurrence 28 is hosted by a quartz-eye tonalite that has been intruded by mafic dykes (Fig. 28-2). The quartz-eye tonalite contains 10-40% subrounded to subangular 1-10 mm quartz "eyes" that weather in relief. The rock, bluish-grey on fresh surfaces, weathers pink and is highly siliceous. Muscovite- and chlorite-rich areas are present near dykes. Two prominent joint sets are oriented at 065°/75°SE and 348°/85°SW. Three types of mafic rocks occur locally: (1) aphyric mafic intrusions; (2) a porphyritic mafic intrusion; and (3) silicified chlorite schist. The mafic intrusions are rusty weathered and are black on fresh surfaces. Locally, the rocks are highly silicified, and crosscut by numerous quartz veinlets less than 1 mm thick. The mafic dykes are 4 m wide, trend at 340°, are foliated at 328°/72°NE and are jointed at 058°/85°SE. The porphyritic mafic intrusion contains 10-20%, angular to subangular, 2-20 mm plagioclase phenocrysts in an aphanitic dark green groundmass. This 4-5 m wide dyke trends 325° with a northeasterly dip. The silicified chlorite schist contains less than 1%, 1 mm garnets and is foliated at 335°/86°NE.

MINERALIZATION:

A chlorite-bearing, rusty weathered quartz vein, 30 cm thick exposed over a distance of 2.5 m, crosscuts the quartz-eye granite and one of the mafic dykes. Magnetite (5-8%) associated with chlorite and 1% chalcopyrite occur in the vein. The mafic intrusive rock is rusty weathered and contains 1-3% chalcopyrite and 1% pyrite. The silicified chlorite schist contains 1-2% pyrite and 1% chalcopyrite. Sulphide minerals were not observed in the porphyritic dyke or in the granite.

GEOCHEMICAL DATA:

Two samples were collected for geochemical analysis (Fig. 28-2, Appendix I); values for Au, Cu, Zn and other diagnostic elements are low.

CLASSIFICATION:

Vein-type deposit. Sulphide mineralization associated with quartz veins crosscutting felsic and mafic intrusive rocks.

REFERENCES:

Fedikow, M.A.F., Roney, C.T., Schmidt, G.J. and Robbie, T.J.
1986: Mineral deposit studies in the Snow Lake area; in Manitoba Energy and Mines, Report of Field Activities 1986, p. 77-85.

Froese, E. and Moore, J.M.
1980: Metamorphism in the Snow Lake area, Manitoba; Geological Survey of Canada, Paper 78-27, 16 p.

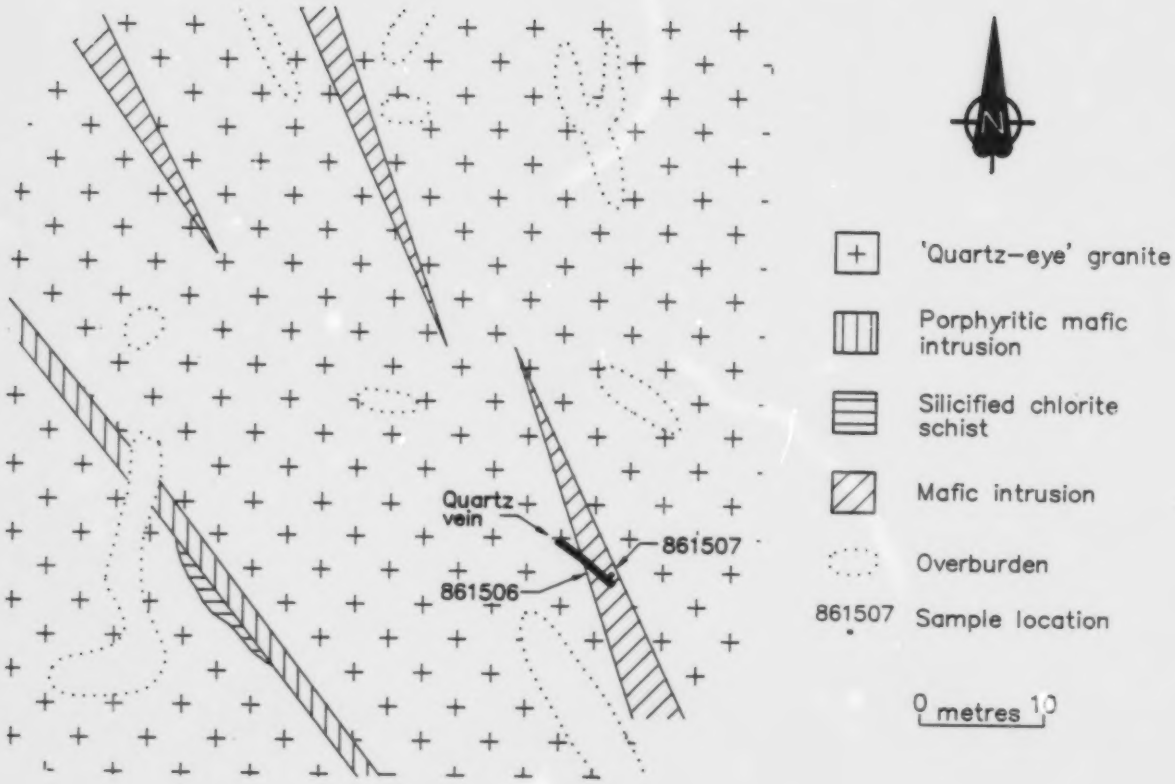


*Figure 28-2: Detailed geology and sample locations at occurrence 28*

**LOCATION: 29**

**NAME: BOUNTER ZONE (Parson No. 12)**
**UTM: 6081293N/434893E**
**ACCESS: Trails from Snow Lake hospital parking lot.**

**AREA: Eastern edge of the town of Snow Lake**
**AIRPHOTO: A26366-203**

EXPLORATION SUMMARY:

The Bounter property was first staked as two claims, the Parson No. 12 claim by C.R. Parres in 1938 and the Tobruk claim by F. Ebbutt in 1941. Nor-Acme Gold Mines Limited gained control of the claims in 1941 and 1942, respectively. Leases M-1245 and M-1271 were taken on the claims in 1943 and optioned to Howe Sound Exploration Company Limited; the leases expired in 1964. The Bud 8 and Bud 12 claims were staked in 1964 over the zone by J.B. McIntosh who transferred interests to HBED in 1965. HBED completed electromagnetic and magnetometer surveys and diamond drilling from 1980-1982 (Mineral Inventory Card 63K/16NE Au18).

GEOLOGICAL SETTING:

The general area of occurrence 29 is underlain by Amisk Group mafic and felsic pyroclastic and epiclastic rocks that contain numerous primary structures indicating a west-northwest-facing homoclinal sequence (Fig. 29-1) (Galley et al., 1986). Gabbro, hornblendite dykes and a small quartz-feldspar porphyry intrude the stratigraphy. The location of the Bounter Zone coincides with the Bounter Fault, an arcuate sinistral oblique slip reverse fault that is interpreted to splay from the McLeod Road Thrust Fault (op. cit.; Galley et al., 1988).

MINERALIZATION:

The following information is summarized from Galley et al. (1986). The Bounter Zone has been traced by trenching and drilling for approximately 500 m along strike. It consists of fine grained, grey, cherty, quartz-albite-carbonate rock with up to 5% fine grained arsenopyrite needles in addition to pyrite and pyrrhotite. Quartz-carbonate veins are uncommon, unlike the Nor-Acme (location 32) and Snow Lake Mines (locations 13-16) deposits in the area. Alteration includes Fe-carbonate and patchy arsenopyrite and tourmaline in the footwall rocks. East of the Bounter Zone, the Bounter Fault splays into three parts, each with abundant quartz veining and scattered Au occurrences associated with arsenopyrite.

GEOCHEMICAL DATA:

At the widest section of the zone, the Bounter Fault splits into three structures collectively up to 30 m wide; assays of drill core average 3.8 g/t Au over the zone including one 12 m section that contained 15.0 g/t Au (Galley et al., 1986) Harrison (1949) reports "low to moderate" Au assays and the presence of visible Au from trench samples. Four of six samples from rubble and outcrops near trenches (Fig. 29-2) contain from 580 to 7920 ppb Au and 1774 to 18595 ppm As; Au values are directly proportional to As values (Appendix I). Cu values range from 100 to 234 ppm Cu. Ag values range from 0.1-0.6 ppm Ag.

CLASSIFICATION:

Replacement-type deposit. Galley et al. (1988) interpret gold mineralization in the Snow Lake area, including the Bounter Zone, to be associated with carbonatization that overprints the regional metamorphic assemblage. It is controlled by a series of late-D2 reverse faults in the hangingwall block of the McLeod Road Fault.

REFERENCES:


Fedikow, M.A.F., Roney, C.T., Schmidt, G.J. and Robbie, T.J.
1986: Mineral deposit studies in the Snow Lake area; In Manitoba Energy and Mines, Report of Field Activities 1986, p. 77-86.

Galley, A.G., Ames, D.E., and Franklin, J.M.
1988: Geological setting of gold mineralization, Snow Lake, Manitoba; Geological Survey of Canada, Open File 1700.

Galley, A.G., Ziehlke, D.V., Franklin, J.M., Ames, D.E. and Gordon, T.M.
1986: Gold mineralization in the Snow Lake-Wekusko Lake region, Manitoba; In Gold in the western shield (L.A. Clark, ed.); Canadian Institute of Mining and Metallurgy, Special Volume 38, p. 379-398.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping Lakes area, Manitoba; Geological Survey of Canada, Memoir 250, p. 60.

Mineral Inventory Card 63K/16NE Au18
Manitoba Energy and Mines, Minerals Division.

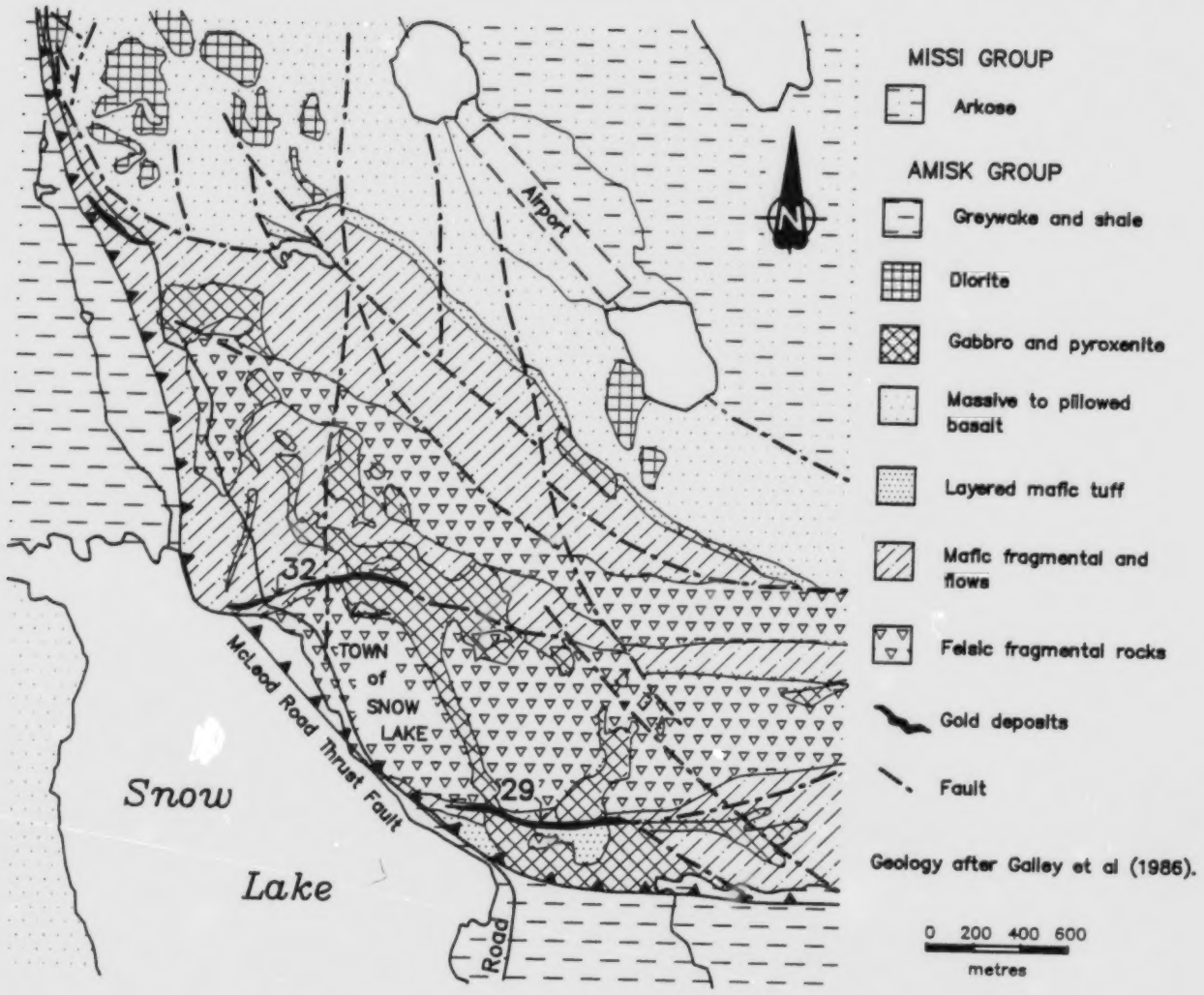


*Figure 29-1: Geological setting of occurrences 29 and 32*

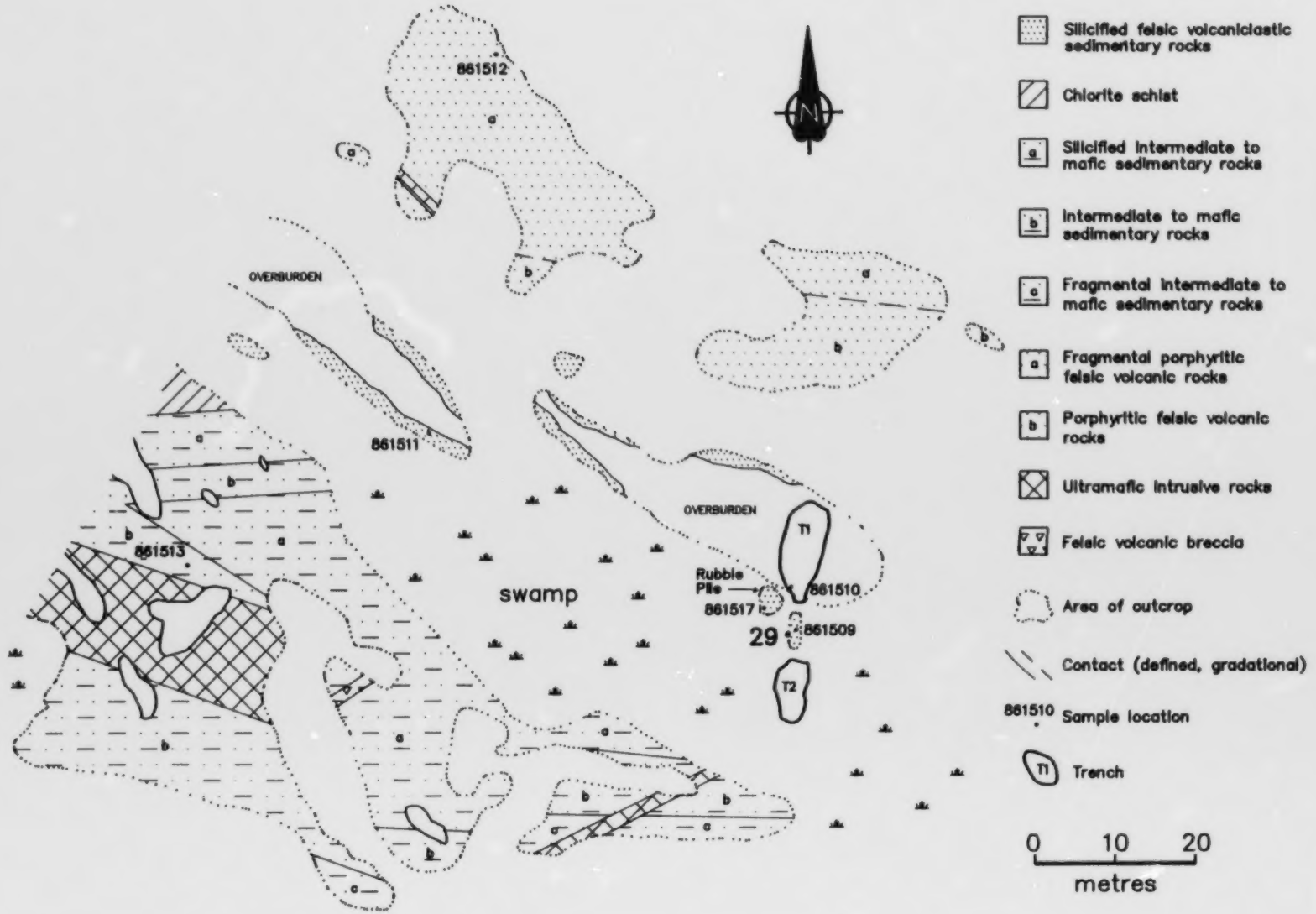


*Figure 29-2: Outcrop distribution, geology, trench and sample locations at occurrence 29*

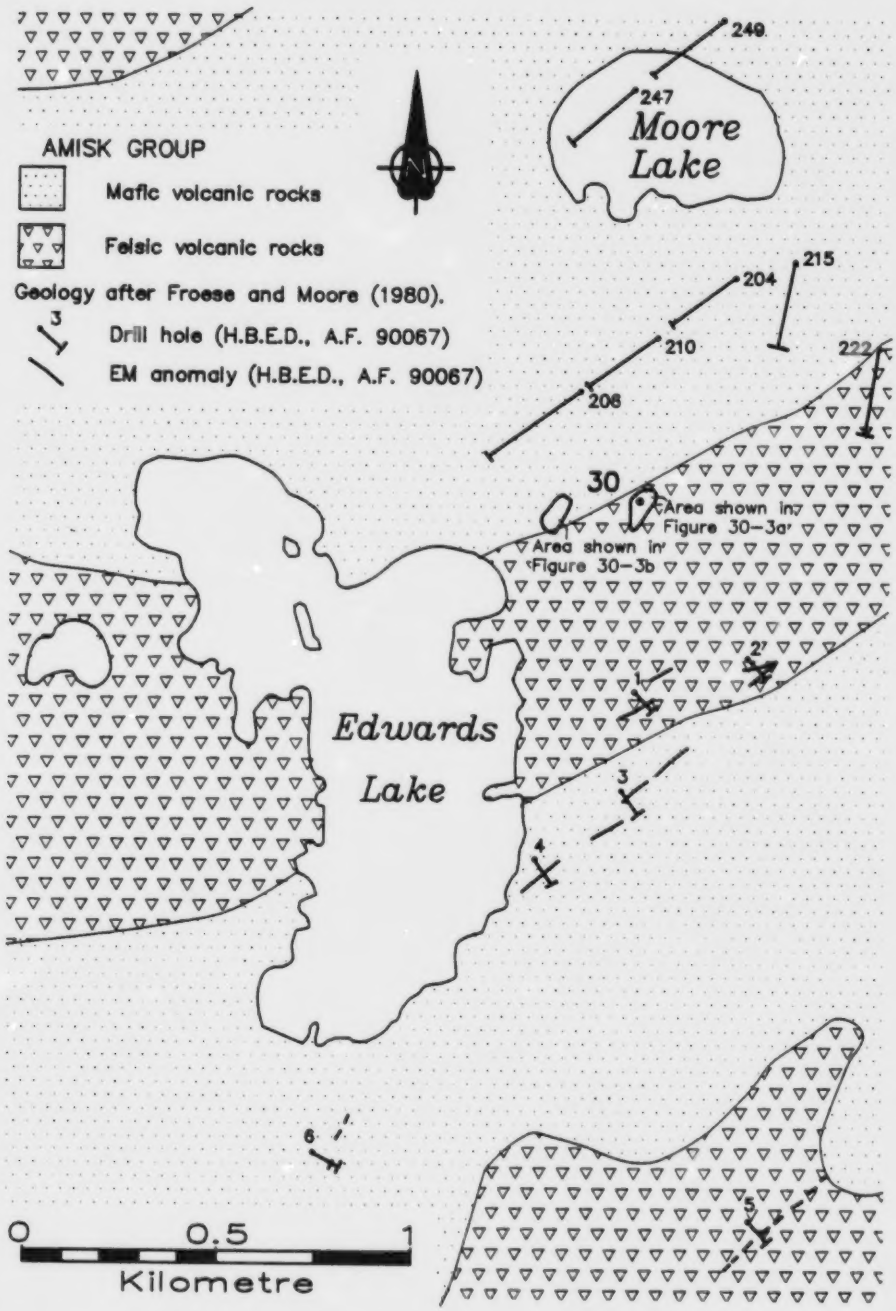


*Figure 30-1: Geological setting of occurrence 30*

**LOCATION:** 30

NAME: MOORE LAKE
UTM: 6074442N/430425E
ACCESS: Traverse from Ghost Mine road or by bush aircraft to Edwards Lake and foot traverse.

AREA: Between Edwards and Moore Lakes
AIRPHOTO: A26366-238

EXPLORATION SUMMARY:

The Moore Lake occurrences were originally staked as part of the Con claims by R.C. Anderson in 1925. In 1945, interests were transferred to Consolidated Mining and Smelting Company of Canada who geologically mapped and sampled the property (A.F. 90047). The claims were cancelled in 1947. The Rim claims, staked for R.C. Crosby in 1955, were optioned to HBED. HBED drilled 13 holes totalling 2987 m in 1955 before dropping its option in 1957 (A.F. 90067). The claims were cancelled in 1961. The present Mud claims, staked in 1962, are held by HBED. They have undertaken various geophysical surveys and diamond drilling in the area (Mineral Inventory Card 63K/16SE Au5).

GEOLOGICAL SETTING:

The general area of occurrence 30 is underlain by Amisk Group mafic and felsic volcanic rocks (Fig. 30-1). The mafic volcanic rocks are dark grey and aphanitic with a foliation that trends 185° with a steep dip to the northeast. The felsic volcaniclastic rocks are foliated (220°/80°NW), fine to medium grained and are characterized by alternating 0.5-26 cm thick felsic and intermediate to mafic layers. Equigranular micas, feldspar and amphibole are the major mineral constituents. Locally, minor feldspar porphyry, amphibolite and diorite are present.

MINERALIZATION:

Harrison (1949) and Consolidated Mining & Smelting Co. (A.F. 90047) describe rare to minor pyrite disseminated in and near quartz veins in mafic volcanic rock. The veins are white and glassy, contain small inclusions of chlorite schist and are rusty weathered along fractures. The veins form irregularly shaped lenses that pinch out within 6-15 m along strike and are up to 2.5 m wide. Locally fine grained garnets occur in the wall rock within 1 m of vein margins. Fedikow et al. (1986) were unable to locate these showings. Samples of silicified mafic volcanic rocks containing 1-2%, very fine grained, disseminated pyrite (Fig. 30-2a,b) were collected for analysis.

Drilling by HBED to the southeast intersected minor pyrrhotite with lesser chalcopyrite and sphalerite that forms disseminations to near solid sulphide stringers (A.F. 90067).

GEOCHEMICAL DATA:

Three samples were collected for geochemical analysis from the area described by Fedikow et al. (1986) (Fig. 30-2a, b; Appendix I): values for Au, Cu, Zn, Pb and other diagnostic elements are low. Assays given by Consolidated Mining & Smelting Co. yielded only trace amounts of gold. Harrison (1949) reports "low" Au assays.

CLASSIFICATION:

Vein-type deposit. Trace to minor sulphide mineralization associated with quartz and sulphide veins in mafic volcanic rocks.

REFERENCES:

Assessment Files 90047, 90067
Manitoba Energy and Mines, Minerals Division.

Fedikow, M.A.F., Roney, C.T., Schmidt, G.J. and Robbie, T.J.
1986: Mineral deposit studies in the Snow Lake area; In Manitoba Energy and Mines, Report of Field Activities 1986, p. 77-86.

Froese, E. and Moore, J.M.
1980: Metamorphism in the Snow Lake area, Manitoba; Geological Survey of Canada, Paper 78-27, 16 p.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping Lakes area, Manitoba; Geological Survey of Canada, Memoir 250, p. 64.

Mineral Inventory Card 63K/16SE Au5
Manitoba Energy and Mines, Minerals Division.

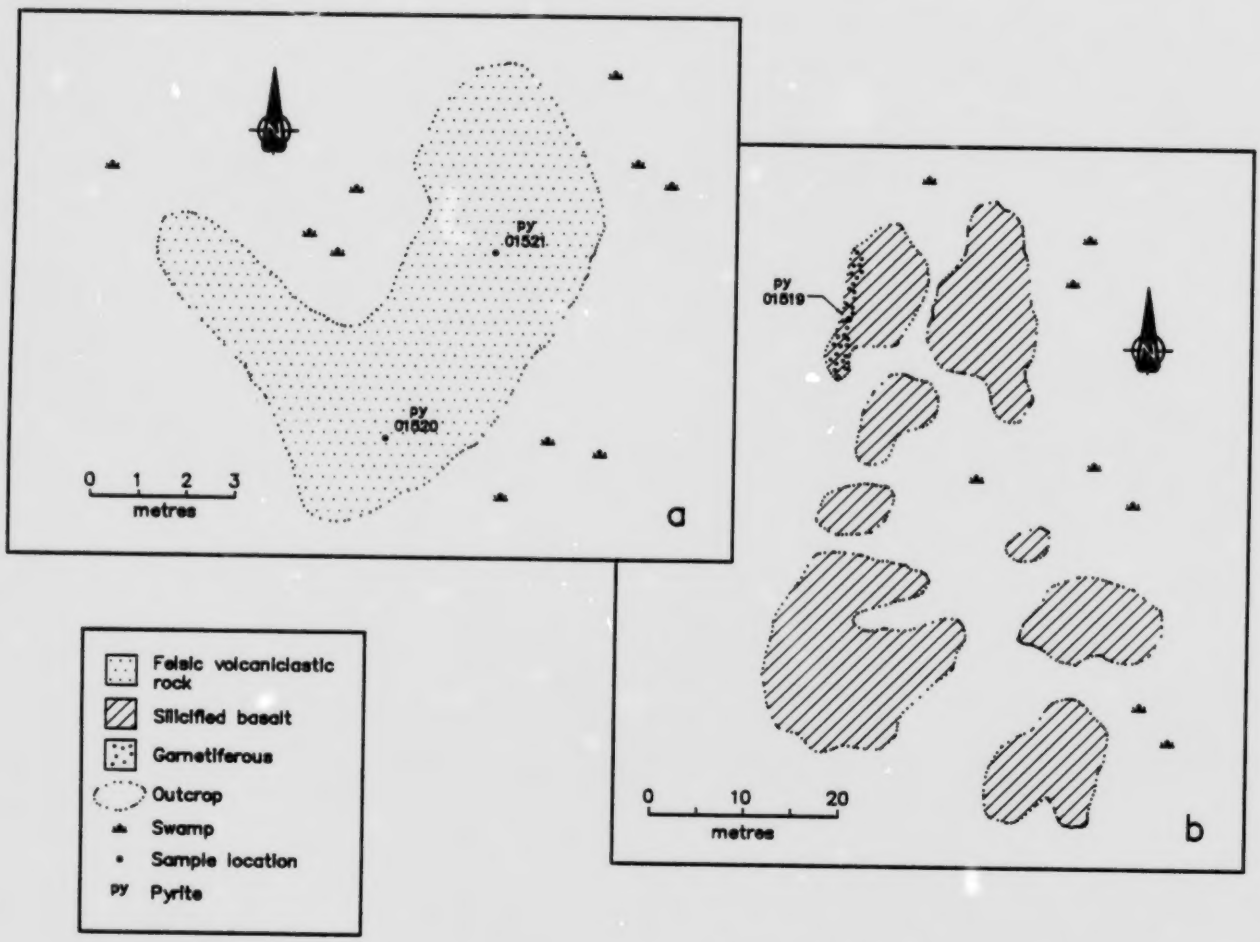


*Figure 30-2:a,b. Outcrop distribution, geology and sample locations and occurrence 30*

**LOCATION: 31**

**NAME: THREEHOUSE LAKE**

**UTM: 6076883N/431469E**

**ACCESS: Portage canoe along CNR track from Provincial Hwy. 395 between Chisel and Ghost lakes. Canoe from railroad tracks down a creek leading into Threehouse Lake. Alternately, by bush aircraft to Threehouse Lake.**

**AREA: Western shore of Threehouse Lake**

**AIRPHOTO: A26366-240**

EXPLORATION SUMMARY:

The Ern No. 5 claim was recorded by E. McKinnon in 1944 with interests transferred to N.S. Beaton later that year. There are reports of diamond drilling on the Ern No. 5, but exact locations and drill logs are not available (Mineral Inventory Card 63K/16SE Au 12; Harrison, 1949). The claim was cancelled in 1947. The Ox 43 claim was staked over the area on behalf of HBED in 1955. In 1960 the area was included in mining lease M-3768 issued to HBM&S in conjunction with the nearby Chisel Lake Cu-Zn Mine.

GEOLOGICAL SETTING:

The general area of occurrence 31 is underlain by Amisk Group mafic and felsic volcanic rocks. The biotite-sillimanite metamorphic isograd has been mapped approximately 1 km south of the occurrence (Fig. 31-1). The occurrence is hosted by very fine grained, locally silicified amygdaloidal basalt. Quartz amygdules are less than 5 mm in diameter and constitute 5-20% of the unit. Occasionally 3-5% red garnets, biotite and chlorite are observed in rusty weathered basalt. The basalt is foliated at 050°/30°SE.

MINERALIZATION:

The rusty weathered basalt contains up to 8% pyrrhotite. Vuggy, rusty weathered 3-25 cm wide quartz veins contain 1-3% pyrite, 1-2% magnetite and visible gold in vugs. Harrison (1949) also observed less than 1% galena.

GEOCHEMICAL DATA:

Five samples representing wall rock and quartz vein were collected for geochemical analysis (Fig. 31-2; Appendix I). Samples 861704 and 861705 contain 1620 and 645 ppb Au respectively. Values for Cu, Zn, Pb and As are low. Harrison (1949) reports "fairly good assays in gold" from narrow quartz veins intersected by diamond drilling in 1945.

CLASSIFICATION:

Vein-type deposit. Auriferous quartz veins in amygdaloidal mafic volcanic flows.

REFERENCES:


Fedikow, M.A.F., Roney, C.T., Schmidt, G.J. and Robbie, T.J.
1986: Mineral deposit studies in the Snow Lake area; In Manitoba Energy and Mines, Report of Field Activities 1986, p. 77-86.

Froese, E. and Moore, J.M.
1980: Metamorphism in the Snow Lake area, Manitoba; Geological Survey of Canada, Paper 78-27, 16 p.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping Lakes area, Manitoba; Geological Survey of Canada, Memoir 250, p. 80.

Mineral Inventory Card 63K/16SE Au12
Manitoba Energy and Mines, Minerals Division.

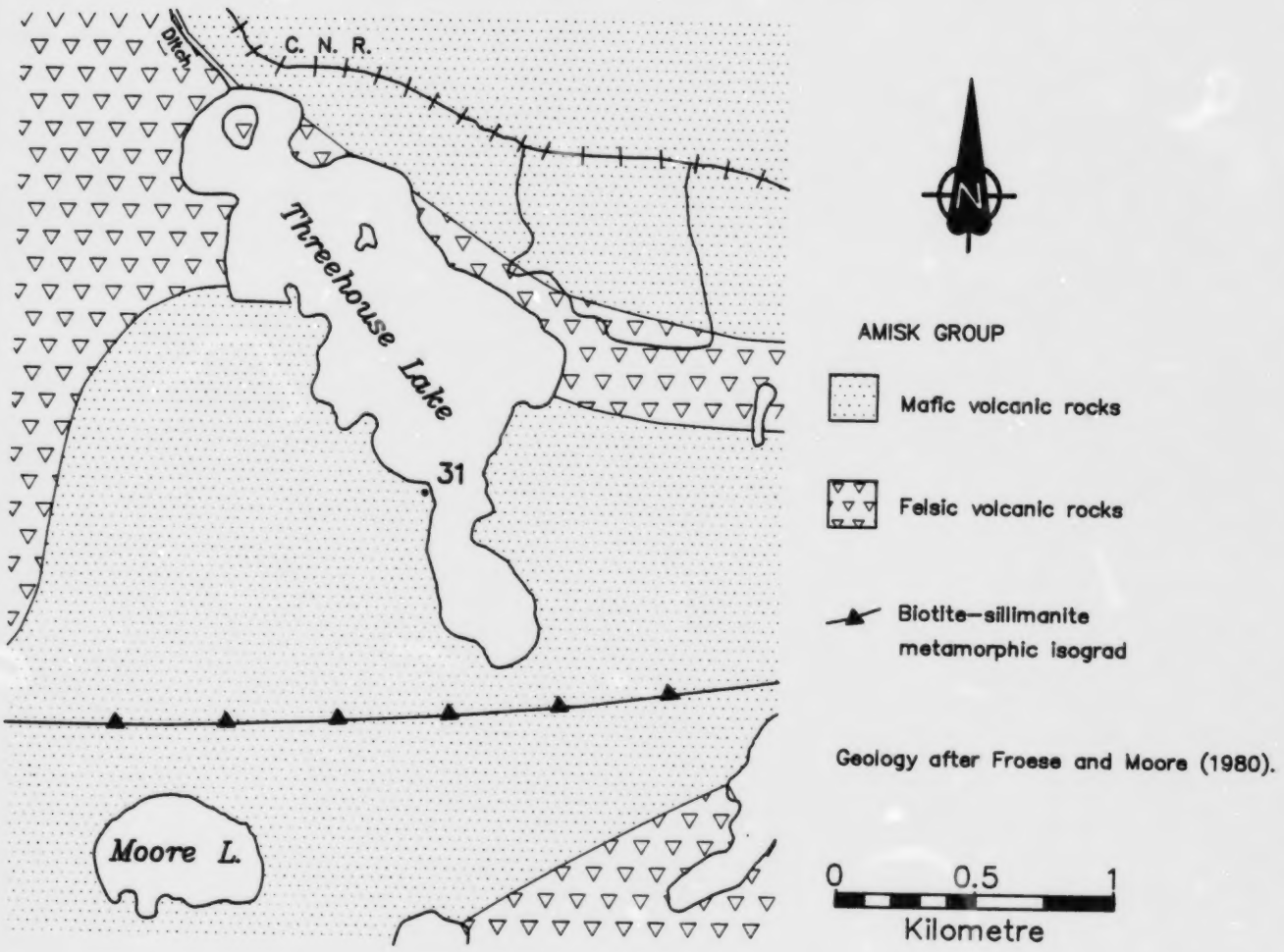


*Figure 31-1: Geological setting of occurrence 31*

**LOCATION: 32**

**NAME: NOR-ACME Au DEPOSIT**
**UTM: 6082454N/434025E**
**ACCESS: Roads within the town of Snow Lake.**

**AREA: North edge of the town of Snow Lake (Fig. 29-1).**
**AIRPHOTO: A26366-203**

EXPLORATION SUMMARY:

The Nor-Acme deposit was first covered by the Chums and Toots claims staked in 1925 by W.R. Henderson and C.R. Parres, respectively. The Chums claim was later transferred to C.R. Parres (date unknown). Wright (1931) describes some of the trenches and pits prospected by C.R. Parres. In 1941 Nor-Acme Gold Mines Limited was formed to develop the property. Howe Sound Exploration Company Limited drilled 15 250 m and outlined two zones, the Main (or Dick) and Toots Zones, with a total of 4 409 320 tonnes averaging 5.14 g/t to a depth of 305 m (Mineral Inventory Card 63K/16 Au1). Production from 1949 to 1958 yielded 19 546 kg Au (Richardson and Ostry, 1987) from 5.8 million tonnes of ore (Galley et al., 1986). Interest in the property reverted back to Nor-Acme Gold Mines Ltd in 1959. In 1980 HBED entered an option agreement and drilled an additional 3880 m (Fig. 32-1). Total indicated reserves in 1982 were 2 510 889 tonnes grading 5.49 g/t Au (Northern Miner, July 22, 1982). HBED dropped its option in 1986. In 1987 Nor-Acme entered into an option agreement with High River Resources to carry out further underground exploration (Northern Miner, June 5, 1987). In 1988, High River Resources made an agreement with Inco Gold by which Inco Gold can earn 50% interest in the property by providing capital to finance the cost of putting the deposit into production (Northern Miner, October 10, 1988). Nor-Acme Gold Mines Limited amalgamated with High River Resources to form High River Gold Mines Limited (Northern Miner, December 19, 1988). Inco Gold, the project manager, announced reserves of 2.2 million tonnes grading 5.0 g/t Au above the 1780 level and an additional 3.25 million tonnes grading 4.9 g/t Au below the 1780 level; further drilling and underground development are being undertaken (Northern Miner, December 19, 1988).

GEOLOGICAL SETTING:

The Nor-Acme property is underlain by Amisk Group mafic and felsic fragmental rocks and flows, biotite schist, and staurolite schist that are intruded by post-Amisk gabbro and pyroxenite (Fig. 29-1)(Richardson and Ostry, 1987). The Nor-Acme orebody occurs along and is subparallel to the Nor-Acme Fault, an arcuate sinistral oblique slip reverse fault that is interpreted to splay from the McLeod Road Thrust Fault (Fig. 32-2)(Galley et al., 1988; Galley et al., 1986). Harrison (1949) notes that the Nor-Acme anticline also provides structural control on the orebody, with the Main Zone at the crest of the anticline and the Toots Zone at the crest of a minor fold on the southwest flank of the anticline.

MINERALIZATION:

The following information, unless otherwise noted, was summarized from Galley et al. (1988) and Galley et al. (1986). The orebody is an elongate zone 300 m long on surface, but is comprised of four separate zones (Toots, Dick, Ruttan, and Hogg Zones) up to 30 m wide at depth (Fig. 32-2). The zones trend easterly with a dip of approximately 45°N and a rake 030° (Davies et al., 1961). Zones of fault breccia consist of carbonatized wall rock fragments in a fine grained matrix of quartz, albite and Fe-carbonate. The margins of the breccia zones are foliated and contain abundant purple oxy-biotite. Up to 3% arsenopyrite needles and grains, 1-2% pyrite and pyrrhotite and lesser chalcopyrite and sphalerite are disseminated in the breccia zones. Visible gold is rare but is usually present as very fine particles. Gold contents are directly proportional to the arsenopyrite content, with highest Au values associated with felted masses of acicular arsenopyrite that are concentrated around fragment edges (Ebbutt, 1944). Late carbonate disseminations and veinlets, which may contain gold, and barren coarse grained quartz veins crosscut the altered and mineralized rocks. Four poorly defined zones of alteration encompass the mineralization. The zones are, from innermost to outermost, characterized by the mineral assemblages: 1) quartz-albite-carbonate-arsenopyrite-chlorite; 2) quartz-albite-biotite-tourmaline-pyrrhotite-(pyrite); 3) epidote-sphene-biotite-pyrrhotite; and 4) fine grained tourmaline in a quartz-calcite matrix cut by large veins of coarse grained clinozoisite.

GEOCHEMICAL DATA:

In 1945 pre-production reserves were reported as 4 409 320 tonnes grading 5.14 g/t (Mineral Inventory Card 63K/16 Au1). Production yielded 19.5 million g Au (Richardson and Ostry, 1987) and 1.174 million g Ag from 5.8 million tonnes of ore (Davies et al., 1961). Total indicated reserves in 1982 were 2 510 889 tonnes grading 5.49 g/t Au (Northern Miner, July 22, 1982)

CLASSIFICATION:

Replacement-type deposit.

REFERENCES:

Davies, J.F., Bannatyne, B.B., Barry, G.S., and McCabe, H.R. 1962: Geology and mineral resources of Manitoba; Manitoba Mines Branch, Special Publication, p. 82-83.

Ebbutt, F.

1944: The Nor-Acme property of the Howe Sound Exploration Company, Snow Lake, Herb Lake Division, Manitoba; The Precambrian, v. 17, no. 7, p. 6-11.

Galley, A.G., Ames, D.E., and Franklin, J.M.

1988: Geological setting of gold mineralization, Snow Lake, Manitoba; Geological Survey of Canada, Open File 1700.

Galley, A.G., Ziehlke, D.V., Franklin, J.M., Ames, D.E. and Gordon, T.M.

1986: Gold mineralization in the Snow Lake-Wekusko Lake region, Manitoba; in Gold in the Western Shield (L.A. Clark, ed.); Canadian Institute of Mining and Metallurgy, Special Volume 38, p. 379-398.

Harrison, J.M.

1949: Geology and mineral deposits of File-Tramping Lakes area, Manitoba; Geological Survey of Canada, Memoir 250, p. 68-73.

Mineral Inventory Card 63K/16NE Au1
Manitoba Energy and Mines, Minerals Division.

Northern Miner, July 22, 1982.

Richardson, D.J. and Ostry, G.

1987: Gold deposits of Manitoba; Manitoba Energy and Mines, Economic Geology Report ER86-1, p. 44-50.

Wright, J.F.

1931: Geology and mineral deposits of a part of northwest Manitoba; Geological Survey of Canada, Summary Report 1930, part C, p. 93c-95c.

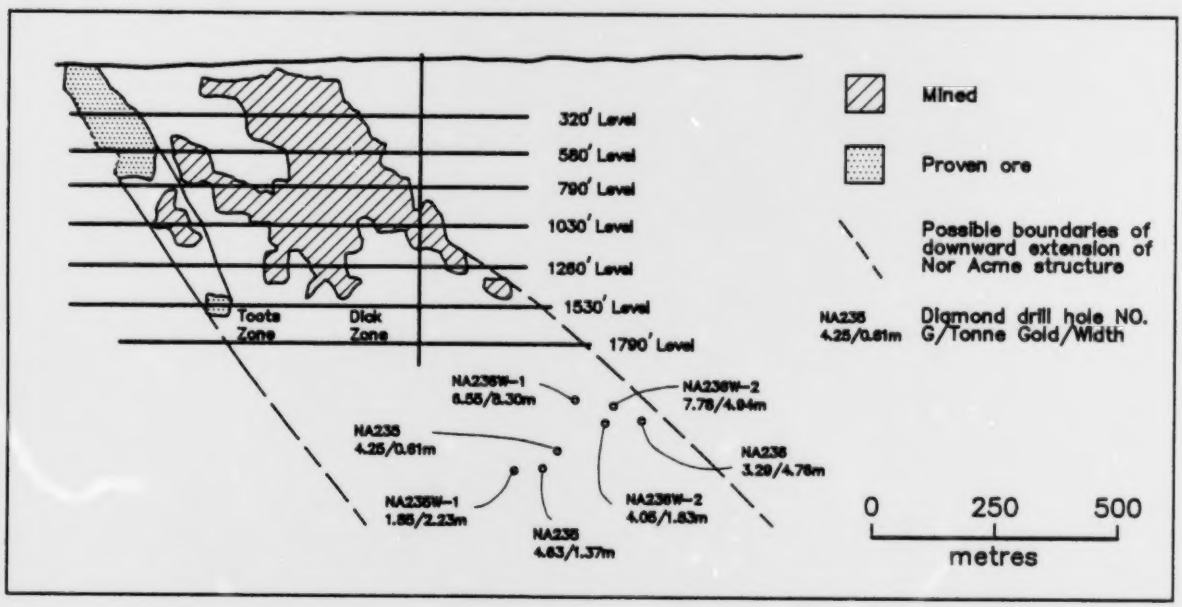


*Figure 32-1: Longitudinal section of the Nor-Acme Au deposit*

**LOCATION: 33**

**NAME: CHISEL LAKE ZN-CU DEPOSIT**
**UTM: 6076526N/427988E**
**ACCESS: Provincial Highway No. 395.**

**AREA: Southern end of Chisel Lake**
**AIRPHOTO: A26366-188**

EXPLORATION SUMMARY:

The H.H. No. 1 claim was recorded over the area in 1945 by J.B. Home-Hay and was cancelled in 1948. In 1955 the area was staked as part of the Ox group by J.G. Bragg who transferred his interest to HBM&S. Following drilling of a weak electromagnetic anomaly in 1956, 15 572 m of diamond drilling outlined the Chisel Lake deposit. After construction of a transmission line and a road from the town of Snow Lake a development shaft was collared in 1957 and Chisel Lake was partially drained. Underground development continued, 4143 m of underground drilling was completed, the surface infrastructure was erected, and an 84 km connecting railway line was completed in 1959. Production began in 1960. Ore reserves were calculated at 4 216 000 tonnes averaging 11.6% Zn, 51.0 g/t Ag, 2.2 g/t Au, 0.52% Cu, 0.7% Pb in 1960 (Mineral Inventory Card 63K/16SE Zn1). At the end of 1984, production and reserves totalled 7 490 000 tonnes with 10.9% Zn and 0.5% Cu; reserves at the end of 1986 consisted of 2 238 757 tonnes with 9.5% Zn and 0.32% Cu (Esposito, 1986). An additional 3.0 million tonnes with an average grade of 9% Zn and 0.2-0.3% Cu has been outlined down plunge from the existing orebody (Northern Miner, Sept. 26, 1988). Development to exploit the crown pillar by open pit mining commenced in 1988; these reserves total 1.2 million tonnes grading 10.5% Zn (op. cit.).

GEOLOGICAL SETTING:

The general area of occurrence 33 is underlain by mafic wacke and tuff and felsic tuff and flows, flanked to the east and west by mafic intrusions (Fig. 33-1). These rocks have been assigned to the Amisk Group. The Chisel Lake orebody occurs within a north-facing sequence of altered subaqueous volcanic rocks on the west limb near the hinge of the Threehouse syncline (Fig. 33-1). Six major stratigraphic units within the mine sequence were identified by Bailes et al. (1987) and Bailes (1986) (Fig. 33-2). These are, from stratigraphically lowest to highest:

1)3300 m of aphyric mafic pillowed flows at the base of the sequence. The pillows are silicified, probably the result of synvolcanic alteration.

2)100-350 m of stratified, thick bedded, heterolithic and monolithic, felsic volcanic breccia and wacke. Minor mafic wacke and breccia occur within the unit, and a regional barren sulphide zone occurs at the base of the unit.

3)150-500 m of plagioclase-pyroxene-phyric, pillowed and massive mafic flows. Epidotization and plagioclase-quartz-bordered fractures are common.

4)1000 m of stratified, thick bedded, heterolithic mixed mafic and felsic volcanic breccia and wacke. Debris flows and local plagioclase-pyroxene-phyric pillowed mafic flows are present within this unit. Zones of silicification and zones of pervasive garnet-chlorite alteration crosscut stratigraphy.

5)250-350 m of felsic volcanic rocks, mainly monolithic breccia and tuff. Massive felsic flows and stratified, thick bedded heterolithic felsic breccia and wacke occur locally.

6)500 m or more of well layered mafic volcanic wacke and tuff ("Chisel basin" sequence). Beds are 15-120 cm thick and abundant primary sedimentary structures are preserved. Lesser basalt flows and coarse breccias and a distinctive coarse felsic fragmental unit (1-10 m thick) constitute the rest of the unit. This unit has been interpreted to have been deposited by mass flows, including turbidity currents, during infilling of an intravolcanic basin. A porphyritic gabbro intrusion disrupts this unit.

Specifically, the Chisel deposit occurs a few metres stratigraphically below the base of the "Chisel basin" sequence of mafic epiclastic rocks in staurolite-garnet-biotite schist and massive tremolite-carbonate rock (Gale and Koo, 1977; Bailes et al., 1987). The footwall to the deposit comprises a 100-250 m thick unit of interlayered massive dacite tuff and lapilli-tuff (Bailes, 1987a). The east lenses of the deposit are overlain by a distinctive coarse felsic fragmental unit (Bailes et al., 1987). The ore zone is truncated to the west by a gabbro intrusion (Martin, 1966).

MINERALIZATION:

The Chisel Lake ore zone is a complex anastomosing series of lenses that occupy the hinge zones of early isoclinal folds. These early folds have been overprinted by open folds that are probably synchronous with formation of the Threehouse syncline (Fig. 33-3, -4). In the upper levels of the mine the ore lenses are compressed into a sheet that has a strike of 337°/45°E with approximate dimensions of 245 m in length and a thickness of 18 m. Below the 650 level the ore zone diverges into three main irregular ore shoots. The location of the ore shoots within the alteration zone is controlled by plunging fold axes (Martin, 1966).

In the deposit sphalerite is the predominant sulphide ore mineral. Pyrite, pyrrhotite, chalcopyrite, galena, arsenopyrite and gold are less abundant ore constituents (Williams, 1966). The Cu/Zn ratio increases with depth (Bailes, 1987a) reflecting the copper-rich nature of the alteration pipe.

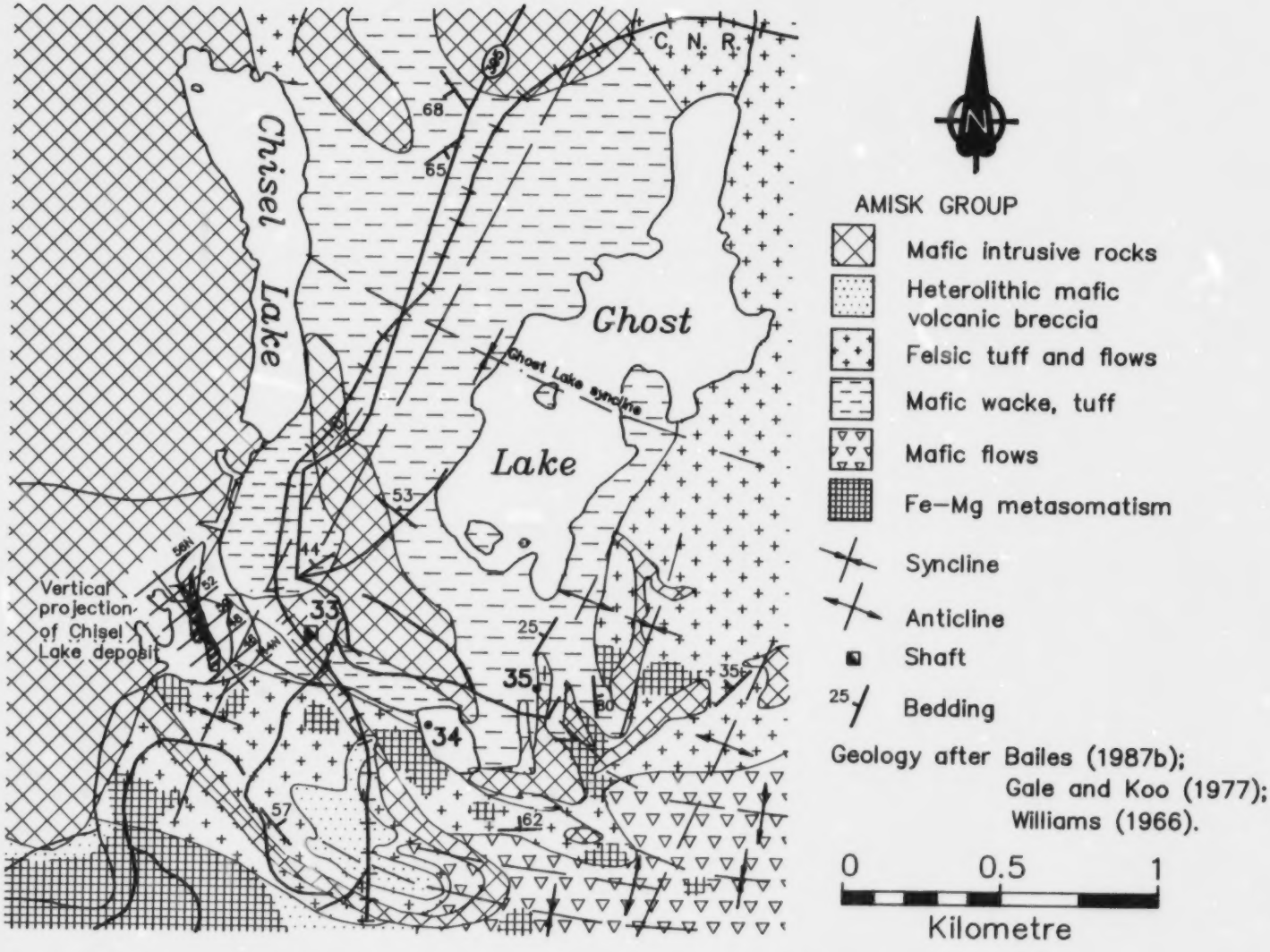


*Figure 33-1: Geological setting of the Chisel Lake Mine (33), Lost Lake Mine (34) and Ghost Lake Mine (35)*

The massive ore zone is medium to coarse grained with a granoblastic texture. Subhedral to euhedral pyrite crystals, commonly brecciated and broken, are surrounded by a matrix of sphalerite and other sulphide minerals (Williams, 1966). Sulphides may occur as replacements of and interstitially to the silicate minerals.

Mineralization-related alteration has developed an extensive zone of chlorite-sericite-biotite schist and massive tremolite-actinolite-carbonate rocks that occur adjacent to the orebody. In addition, garnet, staurolite, andalusite and kyanite are present in the alteration. Footwall alteration extends for approximately 1 km stratigraphically downsection from the west oreshoots (Bailes et al., 1987). Associated footwall alteration to the east lenses has not been observed (Bailes, 1987).

Williams (1966) states that there is "little surface indication" of the presence of the buried Chisel Lake deposit despite areal alteration. Harrison (1949) describes two showings of quartz veins that contain only minor pyrite at the southern end of Chisel Lake.

GEOCHEMICAL DATA:

The total reserves plus past production are 7 490 000 tonnes averaging 10.9% Zn and 0.5% Cu (as of December 31, 1984). Grade figures released in 1960 also included 0.7% Pb, 51.0 g/t Ag and 2.2 g/t Au.

Skirrow (1987) and Williams (1966) present geochemical data on rocks and alteration from the Chisel Lake stratigraphic sequence.

CLASSIFICATION:

Massive sulphide-type Zn-Cu deposit associated with an extensive alteration zone in a subaqueous volcano-sedimentary sequence. Walford and Franklin (1982) describe a model in which metalliferous brines are generated from intrastratal water in rocks underneath the Chisel Lake hydrothermal vent heated by the subvolcanic Sneath Lake pluton. Other intrusions, particularly a felsic dyke swarm and a quartz-plagioclase porphyry body, may have assisted in focussing hydrothermal activity (Bailes et al, 1987).

REFERENCES:


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1987a: Chisel-Morgan lakes project; In Manitoba Energy and Mines, Report of Field Activities 1987, p. 71-79.

Bailes, A.H.
1987b: Chisel-Morgan lakes; Manitoba Energy and Mines, Preliminary Map 1987S-1, Scale 1:15 840.

Bailes, A.H.
1986: Chisel-Morgan lakes project; In Manitoba Energy and Mines, Report of Field Activities 1986, p. 71-76.

Bailes, A.H., Syme, E.C., Galley, A., Price, D.P., Skirrow, R. and Ziehlke, D.J.
1987: Early Proterozoic volcanism, hydrothermal activity, and associated ore deposits at Flin Flon and Snow Lake, Manitoba; Geological Association of Canada, Field Trip Guidebook 1, 95 p.

Davies, J.F., Bannatyne, B.B., Barry, G.S. and McCabe, H.R.
1962: Geology and mineral resources of Manitoba; Manitoba Mines Branch, Special Publication, 190 p.

Esposito, B.
1986: Copper and zinc in Manitoba; Manitoba Energy and Mines, Mineral Education Series, 24 p.

Gale, G.H. and Koo, J.
1977: Evaluation of massive sulphide environments; Canada-Manitoba Non-Renewable Resource Evaluation Program, 2nd Annual Report 1976-1977, p. 43-62.

Gale, G.H., Baldwin, D.A. and Koo, J.
1980: A geological evaluation of Precambrian massive sulphide deposit potential in Manitoba; Manitoba Mineral Resources Division, Economic Geology Report ER79-1, 137 p.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping Lakes area, Manitoba; Geological Survey of Canada, Memoir 250, p. 53.

Martin, P.L.
1966: Structural analysis of the Chisel Lake orebody; Canadian Mining and Metallurgical Bulletin, p. 630-636.

Mineral Inventory Card 63K/16SE Zn1
Manitoba Energy and Mines, Minerals Division.

Northern Miner, September 26, 1988.

Skirrow, R.G.
1987: Silicification in a semiconformable alteration zone below the Chisel Lake massive sulphide deposit, Manitoba; M.Sc. thesis (unpublished), Carleton University, 171 p.

Walford, P.C. and Franklin, J.M.
1982: The Anderson Lake Mine, Snow Lake, Manitoba; In Hutchinson, R.W., Spence, C.D. and Franklin, J.M. (eds.), Precambrian Sulphide Deposits, Geological Association of Canada, Special Paper 25, p. 481-524.

Williams, H.
1966: Geology and mineral deposits of the Chisel Lake map-area, Manitoba; Geological Survey of Canada, Memoir 342, 38 p.

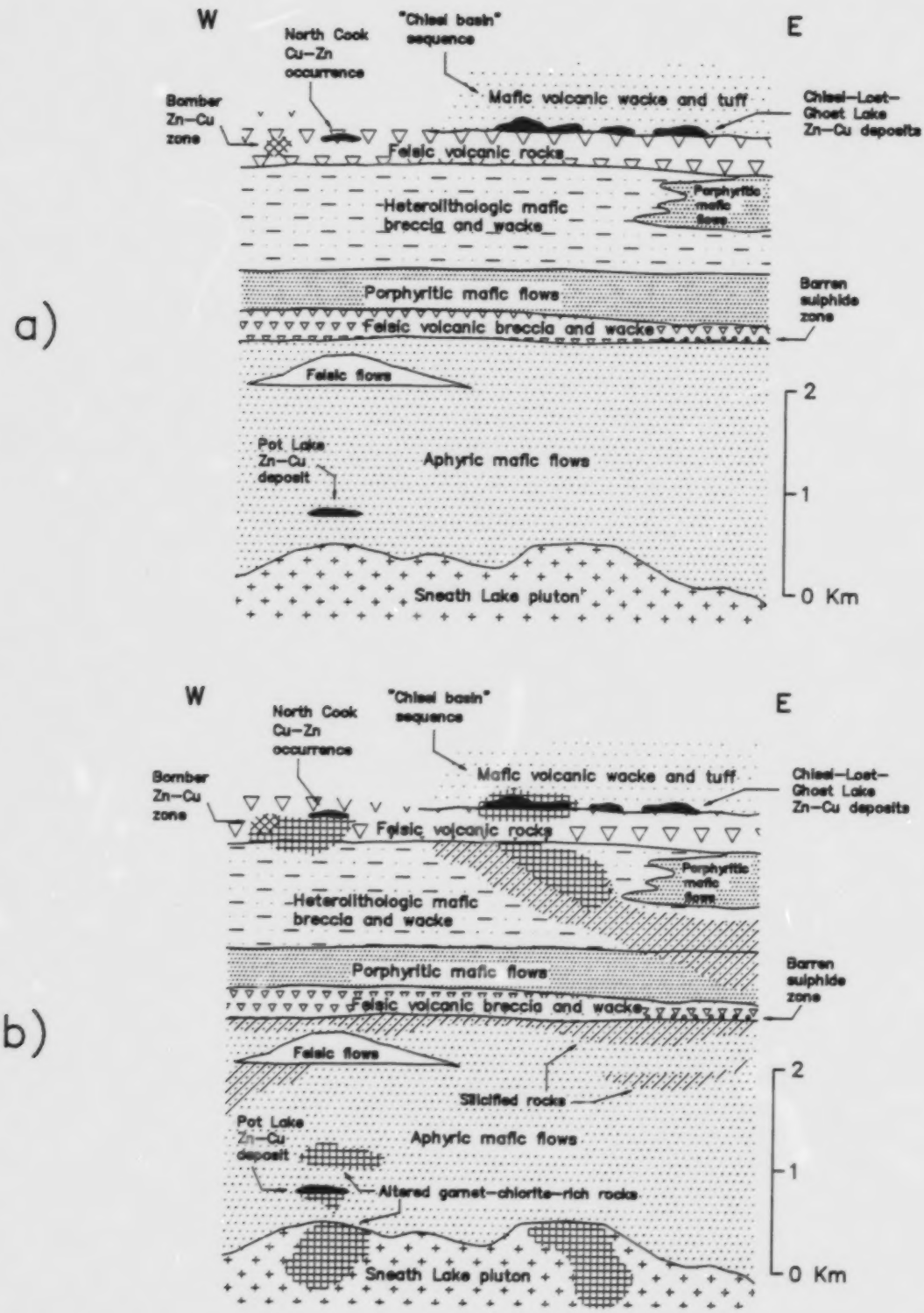


*Figure 33-2: Schematic representation of a) stratigraphic sequence and b) alteration zones at the Chisel, Lost and Ghost lakes deposits (33, 34, 35), Bomber zone (24), North Cook occurrence (78) and Pot Lake deposit (25)*

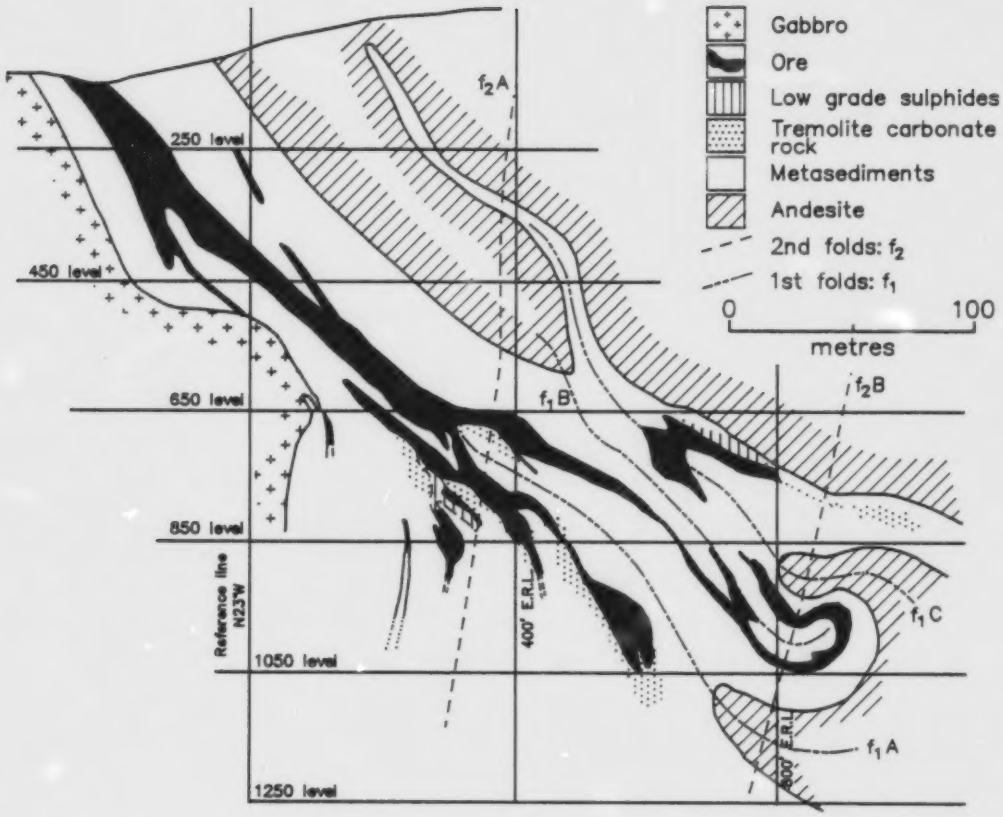


*Figure 33-3: Cross section of the Chisel Lake Mine through 53+50N*

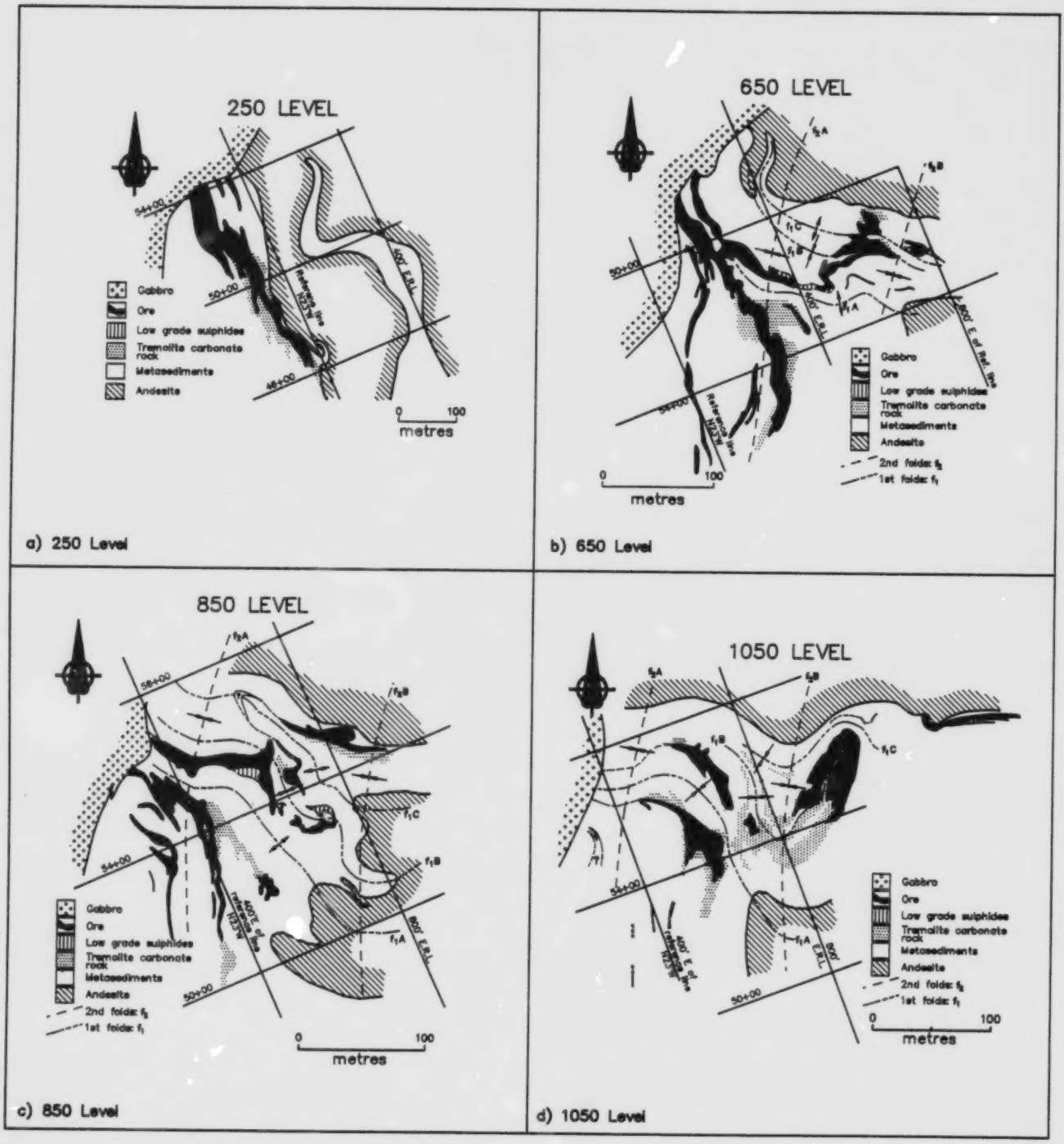


*Figure 33-4: Level plans illustrating the pattern of ore distribution in the Chisel Lake Mine*

**LOCATION: 34**

**NAME: LOST LAKE ZN-CU DEPOSIT**

**UTM: 6076214N/428729E**
**ACCESS: Provincial Highway No. 395.**

**AREA: 0.8 km southeast of the Chisel Lake Mine, at Potten Lake (a.k.a. Lost Lake; Fig. 33-1)**
**AIRPHOTO: A26366-188**

EXPLORATION SUMMARY:

The area was staked in 1955 as part of the Ox claims and assigned to HBED. The claims have been leased by H.B.M.&S since 1960. The deposit was discovered in 1974 by drilling a structural target (HBM&S Annual Report, 1974). The deposit consists of two lenses totalling 272 525 tonnes averaging 7.0% Zn, 0.86% Cu, 49.4 g/t Ag, 1.5 g/t Au. Production commenced in 1979 as part of the Ghost Lake mining operation.

Combined production and reserve estimates for the Ghost Lake-Lost Lake operation were 646 000 tonnes grading 8.5% Zn, 1.3% Cu as of December 31, 1984 (Esposito, 1986).

GEOLOGICAL SETTING:

The general area of occurrence 34 is underlain by mafic wacke and tuff and felsic tuff and flows, flanked to the east and west by mafic intrusions (Fig. 33-1). These rocks have been assigned to the Amisk Group. The Lost Lake deposit occurs at the same stratigraphic position as the Chisel Lake deposit (see occurrence 33, this report) a few metres stratigraphically below the base of the "Chisel basin" mafic epiclastic sequence of well layered mafic wacke and tuff (Gale and Koo, 1977)(Fig. 33-1). The footwall to the deposit comprises a 100-250 m thick unit of interlayered massive dacite tuff and lapilli-tuff. A 0.5-10 m thick unit of felsic breccia overlies the massive sulphide (Bailes, 1987a).

Although weak pervasive Fe-Mg alteration is common in the footwall felsic tuff, the Lost Lake deposit lacks a discernable footwall alteration pipe (Bailes, 1987a). Bailes et al. (1987) suggest that the Lost Lake deposit is an exhalative deposit that was developed downslope from the Chisel Lake vent.

MINERALIZATION:

Massive sulphide mineralization is similar to that at the Chisel and Ghost deposits. Sphalerite and lesser pyrite, pyrrhotite, chalcopyrite, galena and arsenopyrite constitute the sulphide mineralogy.

GEOCHEMICAL DATA:

Some geochemical data on rock from the Chisel Lake sequence (including the Lost Lake area) are presented in Williams (1966). Two outcrop samples collected from the host rocks to the Lost Lake deposit contained anomalous concentrations of Cu, Pb, Zn, Ag, As and Au (Appendix I).

Two lenses of ore contained a total of 272 525 tonnes of rock averaging 7.0% Zn, 0.86% Cu, 49.4 g/t Ag and 1.5 g/t Au (Mineral Inventory Card 63K/SE Zn6).

CLASSIFICATION:

Massive sulphide-type Zn-Cu deposit. Near solid to solid sulphide mineralization associated with altered mafic wacke and tuff.

REFERENCES:


Bailes, A.H.
1987a: Chisel-Morgan lakes project; In Manitoba Energy and Mines, Report of Field Activities 1987, p. 71-79.

Bailes, A.H.
1987b: Chisel-Morgan lakes; Manitoba Energy and Mines, Preliminary Map 1987S-1, Scale 1:15 840.

Bailes, A.H., Syme, E.C., Galley, A., Price, D.P., Skirrow, R. and Ziehlke, D.J.
1987: Early Proterozoic volcanism, hydrothermal activity, and associated ore deposits at Flin Flon and Snow Lake, Manitoba; Geological Association of Canada, Field Trip Guidebook 1, 95 p.

Esposito, B.
1986: Copper and zinc in Manitoba; Manitoba Energy and Mines, Mineral Education Series, 24 p.

Gale, G.H. and Koo, J.
1977: Evaluation of massive sulphide environments; Canada-Manitoba Non-Renewable Resource Evaluation Program, 2nd Annual Report 1976-1977, p. 43-62.

Gale, G.H., Baldwin, D.A. and Koo, J.
1980: A geological evaluation of Precambrian massive sulphide deposit potential in Manitoba; Manitoba Energy and Mines, Economic Geology Report ER79-1, 137 p.

Mineral Inventory Card 63K/16SE Zn6
Manitoba Energy and Mines, Minerals Division.

**LOCATION: 35**

**NAME: GHOST LAKE ZN-CU DEPOSIT**
**UTM: 6076369N/429117E**
**ACCESS: Provincial Highway No. 395.**

**AREA: 250 m southeast of Ghost Lake (Fig. 33-1)**
**AIRPHOTO: A26366-188**

EXPLORATION SUMMARY:

The area around the Ghost Lake Mine was staked as part of the Ox claims in 1955 and assigned to HBED. HBED conducted 6464 m of diamond drilling and discovered the deposit in 1956. HBM&S leased the property in 1960 and after construction of an access road completed an additional 824 m of drilling. Development of a decline commenced in 1970; production at 250 tons/day commenced in 1972. In 1978 a haulage at the 650 foot level connecting to the Chisel Lake production shaft was completed. Drill indicated reserves estimated in 1956 were 287 300 tonnes grading 11.6% Zn, 1.42% Cu, 39.0 g/t Ag, 0.4 g/t Au and 0.91% Pb. Total production and reserve figures as of December 31, 1984 for the Ghost Lake-Lost Lake operation were 646 000 tonnes averaging 8.5% Zn, 1.3% Cu (Esposito, 1986).

GEOLOGICAL SETTING:

The general area of occurrence 33 is underlain by mafic wacke and tuff and felsic tuff and flows, flanked to the east and west by mafic intrusions (Fig. 33-1). These rocks have been assigned to the Amisk Group. The Ghost Lake orebody occurs at the same stratigraphic position as the Chisel Lake deposit (see occurrence 33 this report) a few metres stratigraphically below the base of the "Chisel basin" mafic epiclastic sequence of well layered mafic wacke and tuff (Gale and Koo, 1977) (Fig. 33-1). The footwall to the deposit comprises a 100-250 m thick unit of interlayered massive dacite tuff and lapilli-tuff. A 0.5-10 m thick unit of felsic breccia overlies the massive sulphide (Bailes, 1987a).

Fe-Mg metasomatic alteration of the footwall felsic tuffaceous rocks is common (Bailes, 1987a). Staurolite occurs in the footwall rocks immediate to the deposit (Williams, 1966). Bailes et al. (1987) suggest that the Ghost (and nearby Lost) Lake deposits are exhalites that developed downslope from the Chisel Lake deposit vent, but a thick zone of extensive alteration minerals was observed stratigraphically below the Ghost Lake sulphide lenses and as xenoliths in younger mafic intrusions immediately adjacent to the ore deposit were interpreted as evidence that the Ghost Lake deposit was proximal to its hydrothermal vent (Gale and Koo, 1977).

MINERALIZATION:

The Ghost Lake deposit is lenticular, irregular in shape and is approximately 90 m long, 90 m wide and up to 12 m thick. The orebody has a northwesterly strike and dips to the northeast (Williams, 1966).

The ore mineralogy is similar to that of the Chisel Lake orebody i.e., predominantly sphalerite with lesser chalcopyrite, pyrrhotite, pyrite and galena. Common alteration/gangue minerals include chlorite, biotite, sericite, carbonate and staurolite (Williams, 1966).

GEOCHEMICAL DATA:

Pre-production drill-indicated reserve estimates in 1972 were 319 580 tonnes grading 14.5% Zn, 1.58% Cu, 0.8 g/t Au, 35.0 g/t Ag and 0.3% Pb (Mineral Inventory Card 63K/16SE Zn 2). Some geochemical data on rocks from the Chisel Lake sequence (including the Ghost Lake area) are presented in Williams (1966). Two outcrop samples collected from the host rocks to the Ghost Lake deposit contained anomalous concentrations of Cu, Pb, Zn, Ag, As and Au (Appendix I).

CLASSIFICATION:

Massive sulphide-type Zn-Cu deposit. Near solid to solid sulphide mineralization associated with altered mafic epiclastic rocks.

REFERENCES:


Bailes, A.H.
1987a: Chisel-Morgan lakes project; In Manitoba Energy and Mines, Report of Field Activities 1987, p. 71-79.

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1987b: Chisel-Morgan lakes; Manitoba Energy and Mines, Preliminary Map 1987S-1; Scale 1:15 840

Bailes, A.H., Syme, E.C., Galley, A., Price, D.P., Skirrow, R. and Ziehlke, D.J.
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Davies, J.F., Bannatyne, B.B., Barry, G.S. and McCabe, H.R.
1962: Geology and mineral resources of Manitoba; Manitoba Mines Branch, Special Publication, 190 p.

Esposito, B.
1986: Copper and zinc in Manitoba; Manitoba Energy and Mines, Mineral Education Series, 24 p.

Gale, G.H. and Koo, J.
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Gale, G.H., Baldwin, D.A. and Koo, J.

1980: A geological evaluation of Precambrian massive sulphide deposit potential in Manitoba; Manitoba Energy and Mines, Economic Geology Report ER79-1, 137 p.

Mineral Inventory Card 63K/16SE Zn2
Manitoba Energy and Mines, Minerals Division.

Williams, H.

1966: Geology and mineral deposits of the Chisel Lake map-area, Manitoba; Geological Survey of Canada, Memoir 342, 38 p.

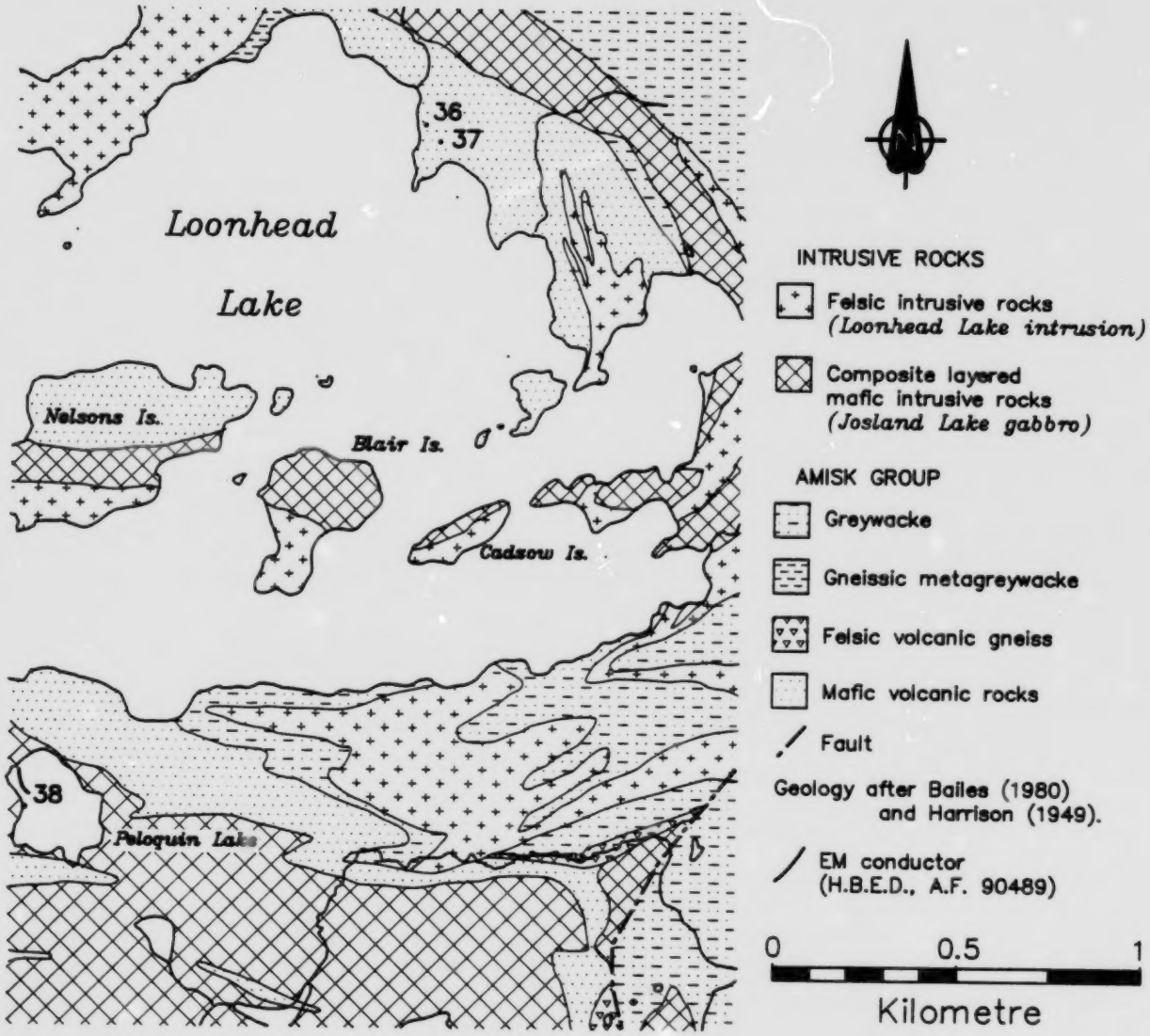



*Figure 36-1: Geological setting of occurrence 36*

**LOCATION: 36**

**NAME: LOONHEAD LAKE NORTH**
**UTM: 6092016N/406060E**
**ACCESS: Bush aircraft/traverse.**

**AREA: Northeast of Loonhead Lake**
**AIRPHOTO: A26368-78**

EXPLORATION SUMMARY:

Mineralization at occurrences 36 and 37 (Fig. 36-1) are referred to as Loonhead Lake North on Mineral Inventory Card 63K/16 Cu 7. Trenching in this area was first noted by Wright (1930) and was later visited by Harrison (1949). The first recorded claim in the area of these occurrences was staked by G. Mellon in 1956. Presently (1988) the area is covered by C.B. 10889 held by HBED. A trench and shallow shaft at occurrence 36 (Fig. 36-2) and four parallel trenches 120 m southeast at occurrence 37 (Fig. 37) were investigated by Ostry (1984).

GEOLOGICAL SETTING:

The area is underlain by mafic volcanic gneiss (Harrison, 1949; Bailes, 1980) Immediate host rocks to the mineralization consist of layered, very fine grained intermediate to felsic rock units. In thin section the host rocks are predominantly quartz/feldspar (80:20) with accessory amphibole, biotite and disseminated sulphide.

MINERALIZATION:

At location 36 a shaft and shallow trench intersect solid and near solid fine grained pyrrhotite with minor pyrite that occurs as augen and large (up to 5 cm) poikiloblastic crystals; minor chalcopyrite mobilizate was observed.

All sulphide units have annealed in response to regional metamorphism resulting in congregations of silicates forming 'balls' (comprised of quartz, feldspar, amphibole and epidote) within the sulphide matrix.

At location 36 the rocks have been intruded by quartz veins and totally effaced by oxidation.

GEOCHEMICAL DATA:

Grab samples of the sulphide mineralization (sample 658423) and crosscutting quartz veins (sample 658425) were collected (Fig. 36-2) for geochemical analysis (Appendix I). Sample 658423 contained 0.08% Cu, 0.17% Zn and 10 ppb Au. Selected geochemical results are presented in Figure 36-2.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation.

REFERENCES:


Bailes, A.H.

1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

Harrison, J.M.

1949: Geology and mineral deposits of File-Tramping lakes area, Manitoba; Geological Survey of Canada, Memoir 250, p. 63.

Ostry, G.

1984: Mineral occurrence studies in the File Lake area of Manitoba; In Manitoba Mineral Resources Division, Report of Field Activities 1984, p. 53-59.

Wright, J.F.

1930: Geology of mineral deposits of a part of northwest Manitoba; Canada Department of Mines and Resources, Summary Report, 1930, Part C, p. 66c-67c.

| SAMPLE | Cu (ppm) | Pb (ppm) | Zn (ppm) | Au (ppb) | Ag (ppm) | Ni (ppm) | Mo (ppm) | As (ppm) |
|---|---|---|---|---|---|---|---|---|
| 658423 | 769 | 29 | 1700 | 10 | 1.8 | 373 | 15 | 48 |

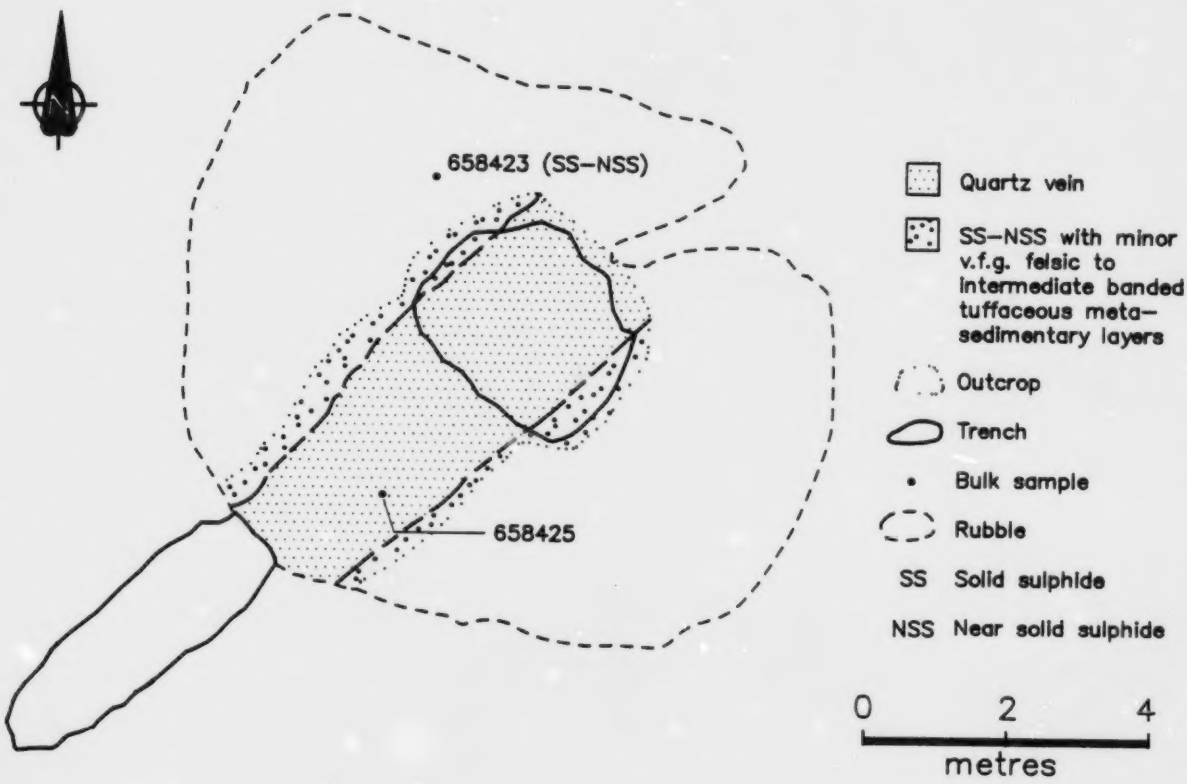



*Figure 36-2: Outcrop distribution, geology, trench and sample locations at occurrence 36*

**LOCATION: 37**

**NAME: LOONHEAD LAKE NORTH**
**UTM: 6091918N/406117E**
**ACCESS: Bush aircraft/traverse.**

**AREA: Northeast of Loonhead Lake**
**AIRPHOTO: A26368-78**

EXPLORATION SUMMARY:

Mineralization at occurrences 36 and 37 (Fig. 36-1) are referred to as Loonhead Lake North on Mineral Inventory Card 63K/16 Cu 7. Trenching in this area was first noted by Wright (1930) and was later visited by Harrison (1949). The first recorded claim in the area of these occurrences was staked by G. Mellon in 1956. Presently (1988) the area is covered by C.B. 10889 held by HBED. A trench and shallow shaft at occurrence 36 (Fig. 36-2) and 120 m southeast four parallel trenches at occurrence 37 (Fig. 37) were investigated (Ostry, 1984).

GEOLOGICAL SETTING:

The area is underlain by mafic volcanic gneiss (Harrison, 1949; Bailes, 1980). Immediate host rocks to the mineralization consist of layered, very fine grained intermediate to felsic rock units. In thin section the host rocks are predominantly quartz/feldspar (80:20) with accessory amphibole, biotite and disseminated sulphide.

MINERALIZATION:

At location 37 four trenches intersect solid and near solid fine grained pyrrhotite with minor pyrite that occurs as augen and large (up to 5 cm) poikiloblastic crystals; minor chalcopyrite mobilizate was observed.

All sulphide units have annealed in response to regional metamorphism resulting in congregations of silicates forming 'balls' (comprised of quartz, feldspar, amphibole and epidote) within the sulphide matrix.

The sulphide-bearing rocks have been intruded by quartz veins and totally effaced by oxidation.

GEOCHEMICAL DATA:

Bulk samples of the sulphide mineralization (samples 65843, 65845 and 65846) and crosscutting quartz veins (sample 65849) were collected (Fig. 37-1) for geochemical analysis (Appendix I). Sample 65845 contained approximately 0.09% Cu and 0.2% Zn. Precious metal values were low. Selected geochemical analysis results are presented in Figure 37-1.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation.

REFERENCES:


Bailes, A.H.

1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

Harrison, J.M.

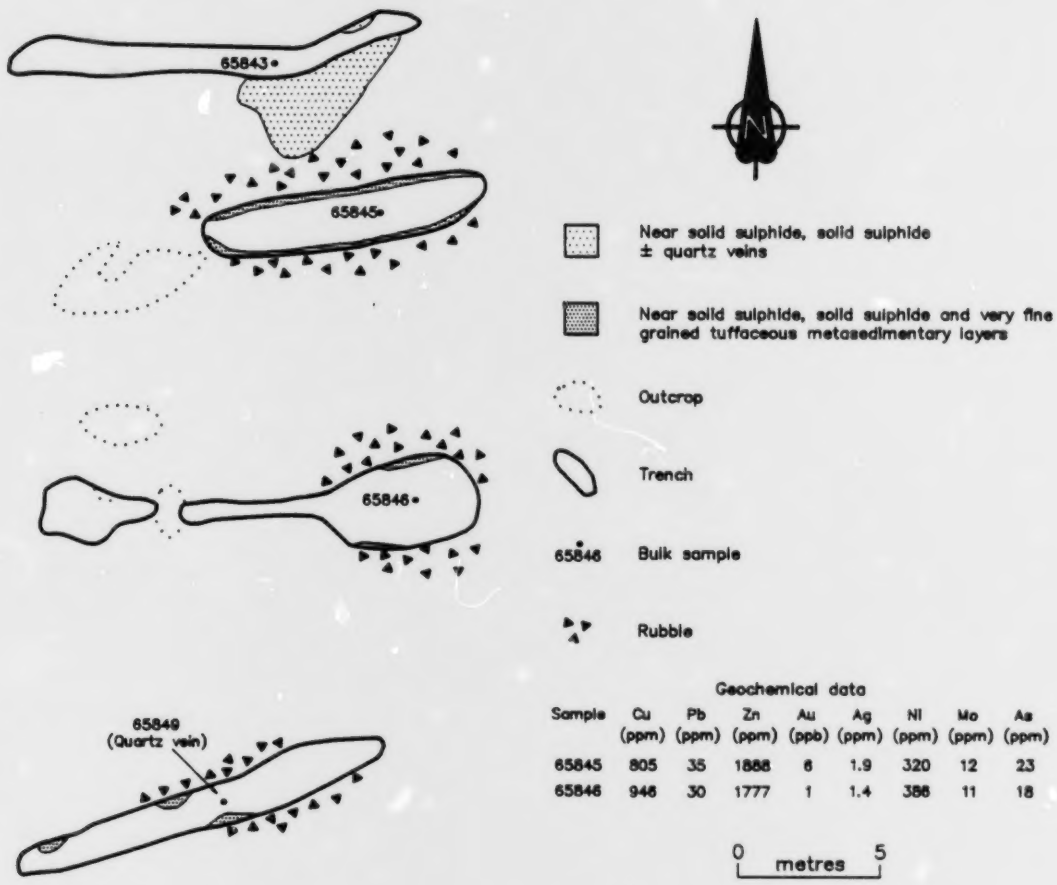
1949: Geology and mineral deposits of File-Tramping lakes area, Manitoba; Geological Survey of Canada, Memoir 250, p. 63.

Ostry, G.

1984: Mineral occurrence studies in the File Lake area of Manitoba; In Manitoba Mineral Resources Division, Report of Field Activities 1984, p. 53-59.

Wright, J.F.

1930: Geology of mineral deposits of a part of northwest Manitoba; Canada Department of Mines and Resources, Summary Report, 1930, Part C, p. 66c-67c.




Geochemical data

| Sample | Cu (ppm) | Pb (ppm) | Zn (ppm) | Au (ppb) | Ag (ppm) | Ni (ppm) | Mo (ppm) | As (ppm) |
|---|---|---|---|---|---|---|---|---|
| 65845 | 805 | 35 | 1888 | 6 | 1.9 | 320 | 12 | 23 |
| 65846 | 948 | 30 | 1777 | 1 | 1.4 | 386 | 11 | 18 |

*Figure 37-1: Geochemical data, trench and sample locations at occurrence 37*

**LOCATION: 38**

**NAME:**
**UTM: 6088327N/403970E**
**ACCESS: Bush aircraft/traverse.**

**AREA: West shore of Peloquin Lake (Fig. 36-1)**
**AIRPHOTO: A26367-173**

EXPLORATION SUMMARY:

Harrison (1949) documented a trenched pyritized zone on the west shore of Peloquin Lake. During 1956 and 1957 HBED conducted a horizontal loop EM Survey (A.F. 90489) over this area. An 125 m long conductor that trends north-northwest and occurs immediately east of location 38 (Fig. 36-1) was detected. Diamond drilling in the vicinity of the conductor was not reported. Two trenches were located (Fig. 38-1) at the lakeshore (Ostry, 1984). The area in and around occurrence 38 is presently (1988) open for staking.

GEOLOGICAL SETTING

A fine grained, white weathered, magnetite-bearing quartz porphyry, interpreted as a post-gabbro intrusion (Bailes, 1980), outcrops along the west shore of Peloquin Lake. In thin section the mineralogy of the host porphyry consists of 80-90% quartz/feldspar (60:40), 5-10% mafic minerals consisting of amphibole, opaque minerals (magnetite, sulphide) and green biotite, and 1-5% quartz phenocrysts (now up to 1 mm recrystallized aggregates of anhedral quartz grains)

MINERALIZATION:

Most of the exposure at occurrence 38 is leached or silicified and crosscut by fine grained, 0.1 to 2 cm thick quartz-hornblende-biotite-magnetite±pyrite±chalcopyrite veins filling possible tensional cooling fractures. A second set of thin, less than 1 mm parallel veins of similar composition has locally displaced the incipient vein set up to 2 cm imparting a 'blocky' look to the exposure. Two trenches are located in the area with the most intense veining and alteration. The vein material is mineralogically similar to the intrusion and suggests that alteration, filling of the fractures, leaching and concentration of sulphides occurred either shortly after emplacement of the porphyry (before it had completely cooled) or later, in response to unloading. Vein material is dominantly hornblende, locally altered to epidote and/or chlorite, quartz, biotite, magnetite, feldspar, saussuritized plagioclase and rare grains of pyrite and/or chalcopyrite. Vein boundaries are generally poorly defined in thin section due to saussuritization of the host rock adjacent to the veins.

GEOCHEMICAL DATA

Three bulk grab samples (Fig. 38-1) were taken for geochemical analysis (Appendix I), one from each of the trenches and one outside the area of most intense mineralization. Sample 658412 (Fig. 38-1) contains 0.03% Cu and 6 ppb Au.

CLASSIFICATION:

Vein-type deposit.

REFERENCES:


Assessment File 90489
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

Harrison, J.M.
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Ostry, G.
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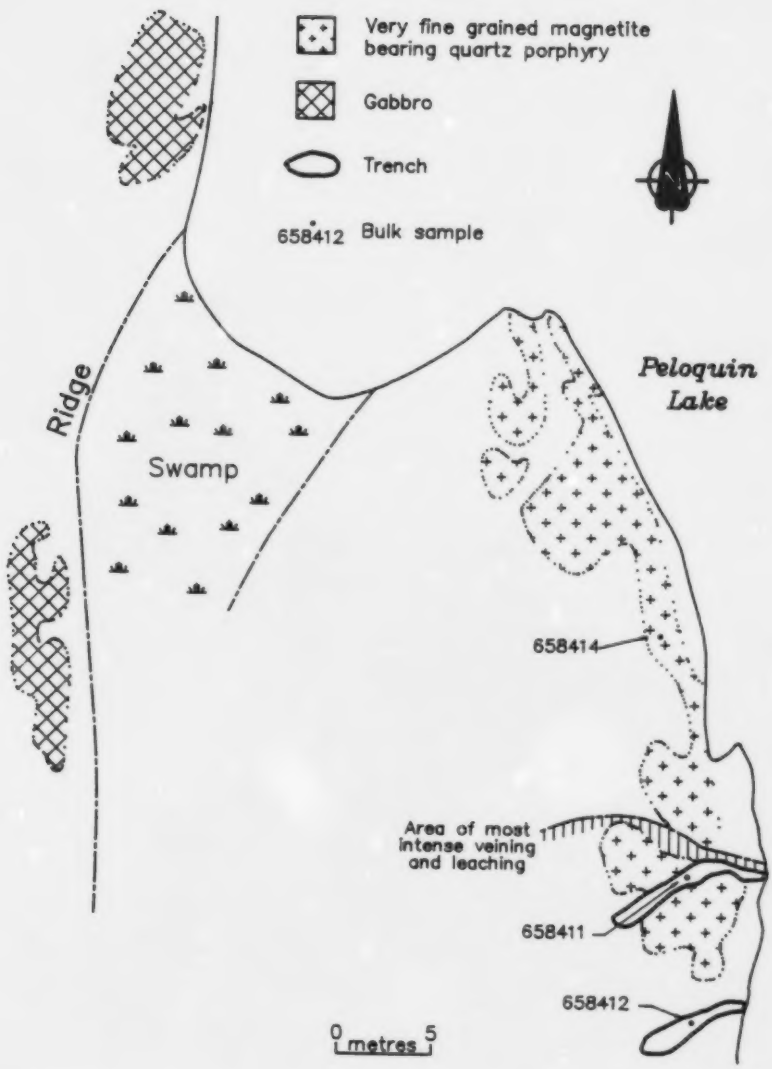



*Figure 38-1: Outcrop distribution, geology, trench and sample locations at occurrence 38*

**LOCATION:** 39

**NAME:** LOONHEAD LAKE SOUTH
**UTM:** 6088667N/404236E
**ACCESS:** Bush aircraft/traverse.

**AREA:** South of Loonhead Lake
**AIRPHOTO:** A26367-173

EXPLORATION SUMMARY:

The mineral occurrence at location 39 (Fig. 39-1) is referred to as Loonhead Lake South on Mineral Inventory Card 63K/16 Pyr 6. During 1956 and 1957 HBED conducted a horizontal loop EM survey over the area (A.F. 90489) and delineated a 850 m long conductor contiguous with stratigraphy and the mineralization at occurrence 39 (Fig. 39-1). HBED tested this conductor with two diamond drill holes (DDH's Hed 1, Hed 3), however diamond drill logs were not included with the report (A.F. 90489). The area is presently (1988) open for staking.

GEOLOGICAL SETTING:

The area is underlain by mafic volcanic gneiss (Harrison, 1949; Stockwell, 1935; Bailes, 1980) Mineralization at occurrence 39 occurs within a 10-15 m thick zone of felsic tuff, reworked tuff and/or chemical sediment/Fe-formation within the mafic volcanic gneiss.

MINERALIZATION:

Old trenches at this locality (Fig. 39-2) have exposed interlayered felsic and mafic sedimentary gneisses that host disseminated (less than 10%) fine grained Fe-sulphide (Ostry, 1984). In thin section the sedimentary gneisses are predominantly quartz/feldspar, amphibole, biotite and disseminated pyrrhotite. The felsic units have the appearance of a metachert in hand sample and are predominantly quartz in thin section (up to 80%). Carbonate/sulphide-rich and amphibole-rich bands (beds?) were also observed in thin section.

GEOCHEMICAL DATA:

A bulk sample from the mineralized zone (Fig. 39-2) was taken for geochemical analysis (Appendix I). The mineralized rock contains 0.02% Cu, 0.04% Zn and 520 ppb Au.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation.

REFERENCES:


Assessment File 90489
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping lakes area, Manitoba; Geological Survey of Canada, Memoir 250, p. 63.

Mineral Invemory Card 63K/16 Pyr 6
Manitoba Energy and Mines, Minerals Division.

Ostry, G.
1984: Mineral occurrence studies in the File Lake area of Manitoba; In Manitoba Mineral Resources Division, Report of Field Activities 1984, p. 53-59.

Stockwell, C.H.
1935: Gold deposits of Elbow-Morton Lake area, Manitoba; Canada Department of Mines, Memoir 186.

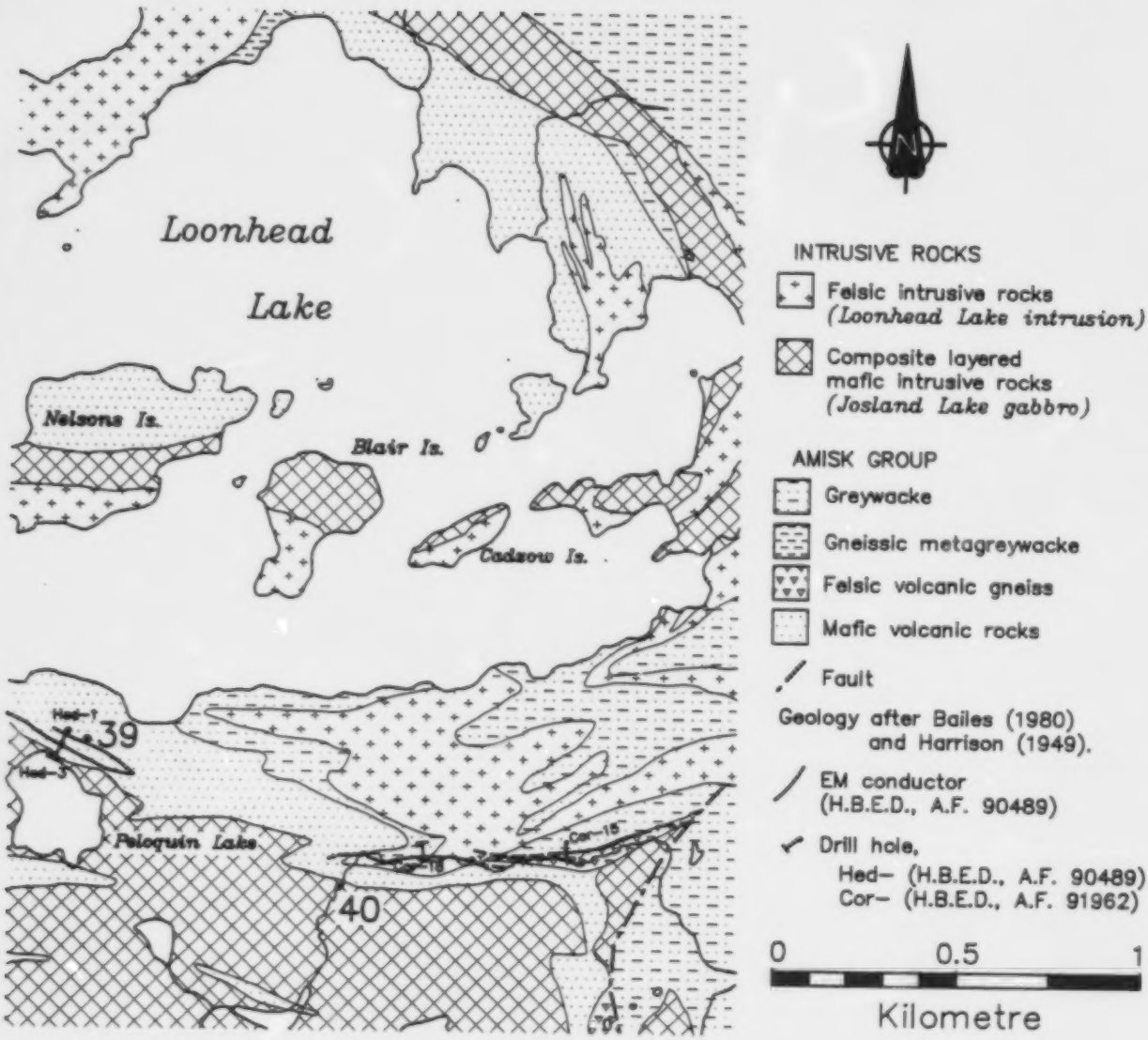



*Figure 39-1: Geological setting of occurrences 39 and 40*

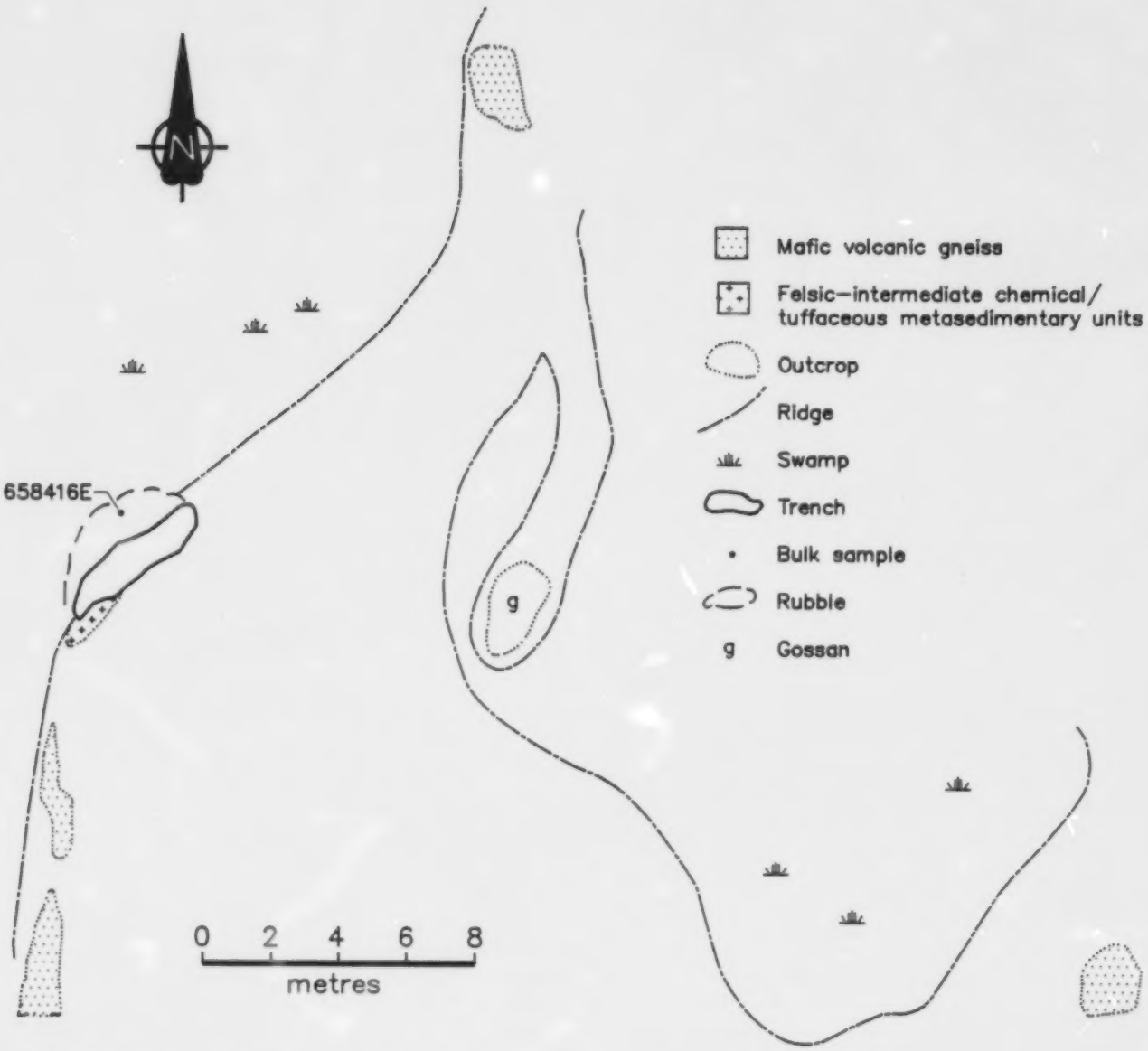



*Figure 39-2: Outcrop distribution, geology, trench and sample locations at occurrence 39*

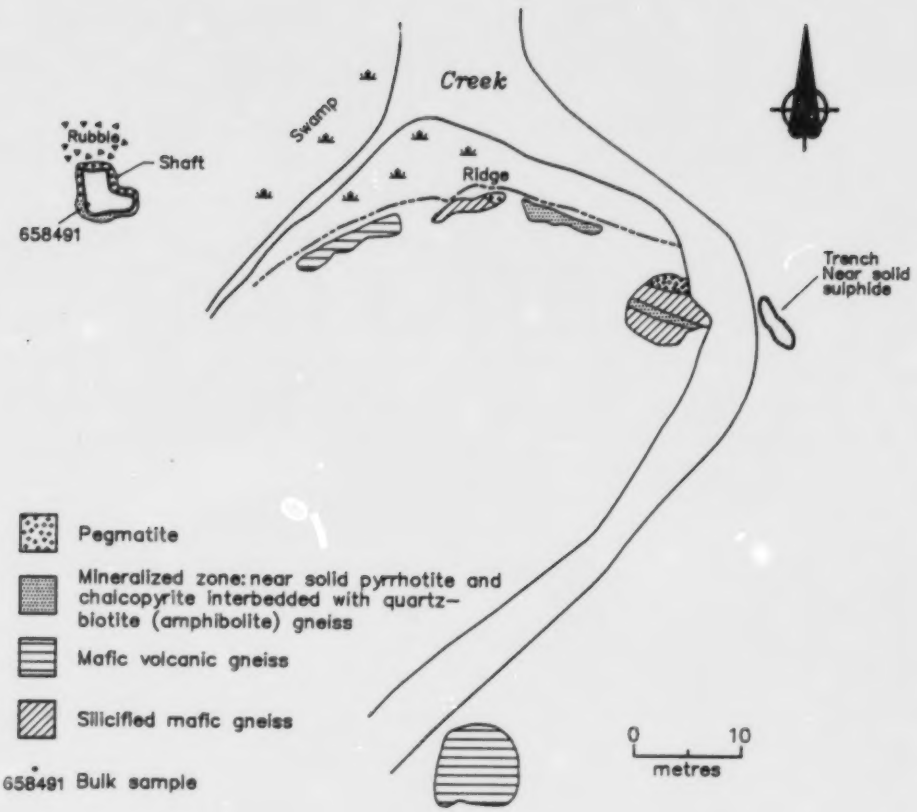



*Figure 40-1: Outcrop distribution, geology, trench and sample locations at occurrence 40*

**LOCATION: 40**

**NAME:**

**UTM: 6087862N/405610E**

**ACCESS: Bush aircraft/traverse.**

**AREA: Northwest of File Lake (Fig. 39-1)**

**AIRPHOTO: A26368-80**

**EXPLORATION SUMMARY:**

During 1965 and 1966 HBED conducted a horizontal loop EM survey (A.F. 90045) over an area that included occurrence 40. A 750 m conductor that trends east-west (Fig. 39-1) and is coincident with the mineralization was detected. In 1967 HBED drilled this anomaly (DDH Cor 18), however the drill log was not submitted (A.F. 91962). A parallel conductor that continues for 1350 m to the east (Fig. 39-1) and may represent a continuation of the mineralized zone was tested by diamond drilling (DDH Cor 15). A shaft and trench were located at occurrence 40 (Ostry, 1984), however the date of work undertaken is not known. The area is presently (1988) covered by claim Loon 2 (W 47779), which is held by Varna Gold Incorporated.

**GEOLOGICAL SETTING:**

The area is underlain by mafic volcanic gneiss (Stockwell, 1935; Harrison, 1949; Bailes, 1980).

**MINERALIZATION:**

A shaft and trench intersect interlayered sulphide-rich pelite (up to 40% Fe sulphide), very fine grained quartz-biotite-feldspar-garnet gneiss and very fine grained biotite-feldspar gneiss (Fig. 40-1). Pyrrhotite is the dominant sulphide and is locally accompanied by lensoid, coarse grained metamorphic pyrite. Up to 1% chalcopyrite occurs as distinct grains and/or fracture-controlled mobilizate. The sulphides occur as thin, contorted and discontinuous, subparallel laminae. Pervasive oxidation has effaced all sulphide-rich rock exposures limiting data collection in most cases to examination of rubble adjacent to the old workings. This conformable zone is envisaged to be on the order of metres to possibly tens of metres in thickness. Visible alteration in and around these sulphide zones is rare except for minor local silicification and/or potassium alteration that is attributed to late shearing and/or pegmatite intrusion.

DDH Cor 15 (A.F. 91962) intersected approximately 5 m of 15-40% pyrrhotite mineralization (with minor pyrite) hosted by quartz-hornblende-biotite gneiss. Disseminated pyrrhotite mineralization within the same rock type was intersected for approximately 20 m above the more massive pyrrhotite mineralization. Numerous pegmatite sections were also intersected.

**GEOCHEMICAL DATA:**

A bulk sample of near solid sulphide (Fig. 40) was taken at the shaft for geochemical analysis (Appendix I). The sample contained 0.02% Cu.

**CLASSIFICATION:**

Chemical sediment type deposit; sulphide facies iron formation.

**REFERENCES:**


Assessment Files 90045, 91962
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping lakes area, Manitoba; Geological Survey of Canada, Memoir 250., 92 p.

Ostry, G.
1984: Mineral occurrence studies in the File Lake area of Manitoba; *in* Manitoba Mineral Resources Division, Report of Field Activities 1984, p. 53-59.

Stockwell, C.H.
1935: Gold deposits of Elbow-Morton Lake area, Manitoba; Canada Department of Mines, Memoir 186.

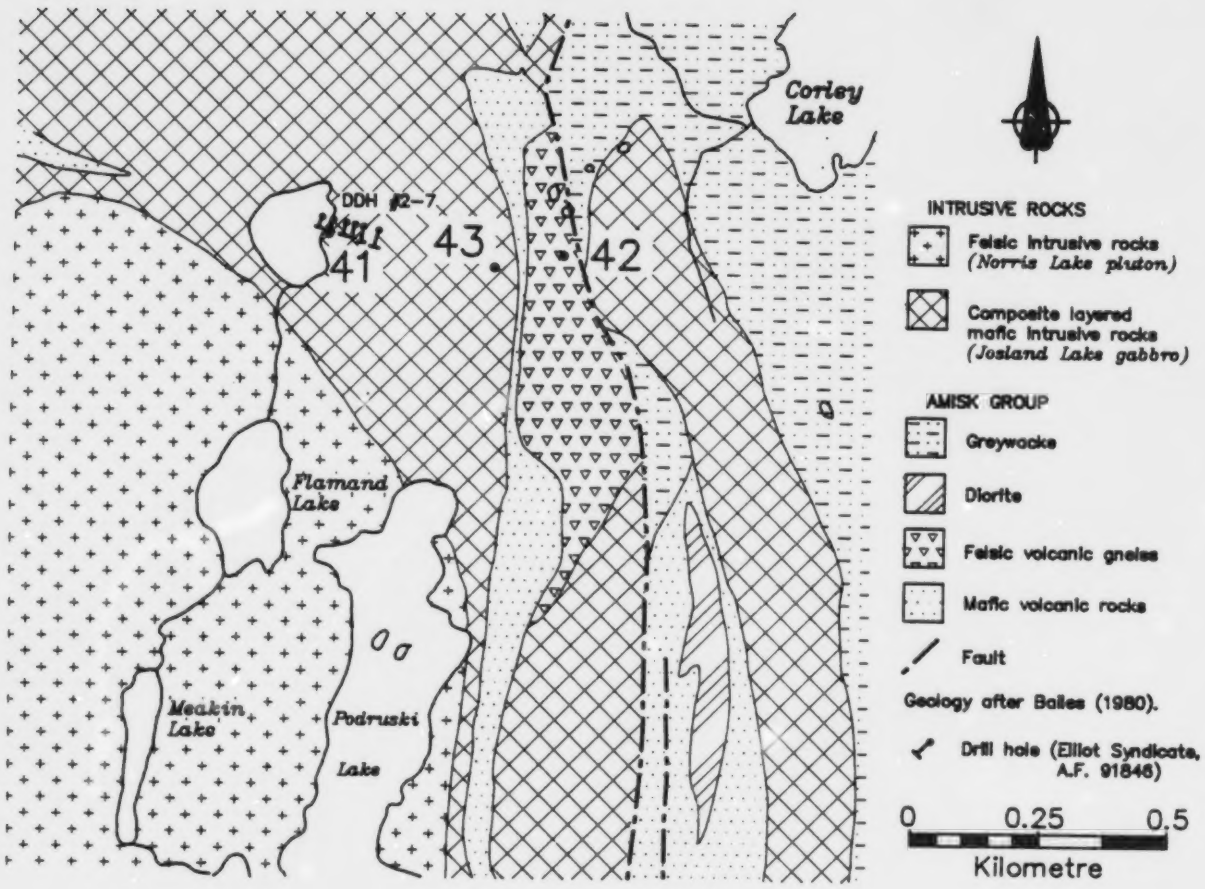



*Figure 41-1: Geological setting of occurrences 41, 42 and 43*

**LOCATION: 41**

**NAME:**
**UTM: 6087000N/406207E**
**ACCESS: Bush aircraft/traverse.**

**AREA: Northwest of File Lake**
**AIRPHOTO: A26368-82**

EXPLORATION SUMMARY:

The area in and around occurrence 41 was originally staked in 1928 by G. Borden. A series of shallow trenches that extend 140 m southeast from the shoreline of a small unnamed lake (Fig. 41-1) were opened up in the early to mid-1930's (Stockwell, 1935). After a number of subsequent owners the Elliott Syndicate, during the summer of 1952, completed six DDHs (DDHs 2-7; Fig. 41-1) in the vicinity of the occurrence (A.F. 91846). The area is presently (1988) covered by claim Loon 1 held by Varna Gold Incorporated.

GEOLOGICAL SETTING:

The area is underlain by gabbroic rocks of the layered composite Josland Lake gabbroic intrusion (Bailes, 1980).

MINERALIZATION:

Mineralization exposed in the trenches was noted by Stockwell (1935) and Harrison (1949). The trenching follows a series of 0.1 - 2 m wide lenses of tourmaline-bearing white saccharoidal quartz (Ostry, 1984) within the porphyritic leucogabbro phase of the Josland Lake gabbro. Locally, the margins of the vein are well mineralized (up to 10%) with pyrite, pyrrhotite, chalcopyrite and arsenopyrite in association with incorporated pieces of wallrock. Away from the vein margins, toward the centre of the vein, the quartz is relatively non-mineralized and undisturbed.

The gabbroic wallrock is sheared and altered, locally exhibits silicification and sericitization, biotite development, quartz + carbonate injection and patchy pyrrhotite, pyrite and/or arsenopyrite mineralization. Strongly foliated wall rocks, alteration and mineralization are restricted to within 1.5 m from the quartz lenses. Three of the eight DDHs completed by the Elliott Syndicate intersected quartz-sulphide mineralization and associated carbonate alteration, similar to that observed in the trenches (Ostry, 1984). Native gold has been reported from this occurrence (Stockwell, 1935).

GEOCHEMICAL DATA:

Stockwell (1935) reported that a channel sample taken across four feet of the mineralization assayed 24 g/t Au. A bulk grab sample from the trenches contained 5.8 g/t Au and 1131 ppm As..

CLASSIFICATION:

Vein-type deposit/multiple quartz lenses.

REFERENCES:


Assessment File 91846
Manitoba Energy and Mines, Mineral Division

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping lakes area, Manitoba; Geological Survey of Canada, Memoir 250, 92 p.

Ostry, G.
1984: Mineral occurrence studies in the File Lake area of Manitoba; in Manitoba Mineral Resources Division, Report of Field Activities 1984, p. 53-59.

Stockwell, C.H.
1935: Gold deposits of Elbow-Morton Lake area, Manitoba; Canada Department of Mines, Memoir 186.

**LOCATION: 42**

**NAME:**
**UTM: 6086903N/407074E**
**ACCESS: Bush aircraft/traverse.**

**AREA: Northwest of File Lake (Fig. 41-1)**
**AIRPHOTO: A26367-65**

EXPLORATION SUMMARY:

The area in and around occurrence 42 (Fig. 41-1) was originally staked in 1928 by G. Borden and is located in the general vicinity of mineral occurrence 6 noted by Harrison (1949). Evidence of trenching or diamond drilling was not observed. The area is presently (1988) covered by claim File 1 (W 47567) held by Varna Gold Incorporated.

GEOLOGICAL SETTING:

The area is underlain by mafic volcanic gneiss (Bailes, 1980).

MINERALIZATION:

At occurrence 41 a northwest-trending 0.3 m thick tourmaline-bearing quartz vein bisects a small 'island', 4 m in diameter, at the south edge of a swamp (Ostry, 1984). Only the vein margins are mineralized with scattered arsenopyrite + pyrite. Pyrrhotite occurs as fine grains associated with inclusions of wall rock. The wall rock is intensely sheared and altered. Pervasive silicification, carbonatization and pyritization were observed over the extent of the small outcrop.

GEOCHEMICAL DATA:

A grab sample of the mineralized quartz contained 165 ppb Au and 900 ppm As.

CLASSIFICATION:

Vein-type deposit.

REFERENCES:


Bailes, A.H.

1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

Harrison, J.M.

1949: Geology and mineral deposits of File-Tramping lakes area, Manitoba; Geological Survey of Canada, Memoir 250, 92 p.

Ostry, G.

1984: Mineral occurrence studies in the File Lake area of Manitoba; In Manitoba Mineral Resources Division, Report of Field Activities 1984, p. 53-59.

**LOCATION: 43**

**NAME:**
**UTM: 6086846N/406842E**
**ACCESS: Bush aircraft/traverse.**

**AREA: West of Ducharme Bay (File Lake; Fig. 41-1)**
**AIRPHOTO: A26368-82**

EXPLORATION SUMMARY:

During 1965 and 1966 HBED conducted a horizontal loop EM survey (A.F. 90045) over an area that included occurrence 43. Conductive zones were not detected in the immediate vicinity. Occurrence 43 is situated near the common boundaries of current (1988) claims File 1 (W47567) and Loon 1 (W 47566) held by Varna Gold Incorporated.

GEOLOGICAL SETTING:

The area is underlain by gabbroic rocks of the layered composite Josland Lake Gabbroic intrusion (Harrison, 1949; Bailes, 1980).

MINERALIZATION:

A mineralized quartz vein that pinches and swells from 5 to 30 cm was traced for approximately 27 m over a ridge of gabbroic intrusive rocks (Ostry, 1984). At the vein margins the gabbro is locally sheared and mineralized with a maximum of 2% fine grained disseminated pyrite that was observed for 20 cm from the vein. Within the quartz up to 1% disseminated pyrite occurs as anhedral to subhedral crystals and locally as a vug infilling. One speck of a white sulphide, possibly arsenopyrite, was observed.

GEOCHEMICAL DATA:

A grab sample of the mineralized quartz contained 504 ppm As and 115 ppb Au.

CLASSIFICATION:

Vein-type deposit.

REFERENCES:


Assessment File 90045
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping lakes area, Manitoba; Geological Survey of Canada, Memoir 250.

Ostry, G.
1984: Mineral occurrence studies in the File Lake area of Manitoba; In Manitoba Mineral Resources Division, Report of Field Activities 1984, p. 53-59.

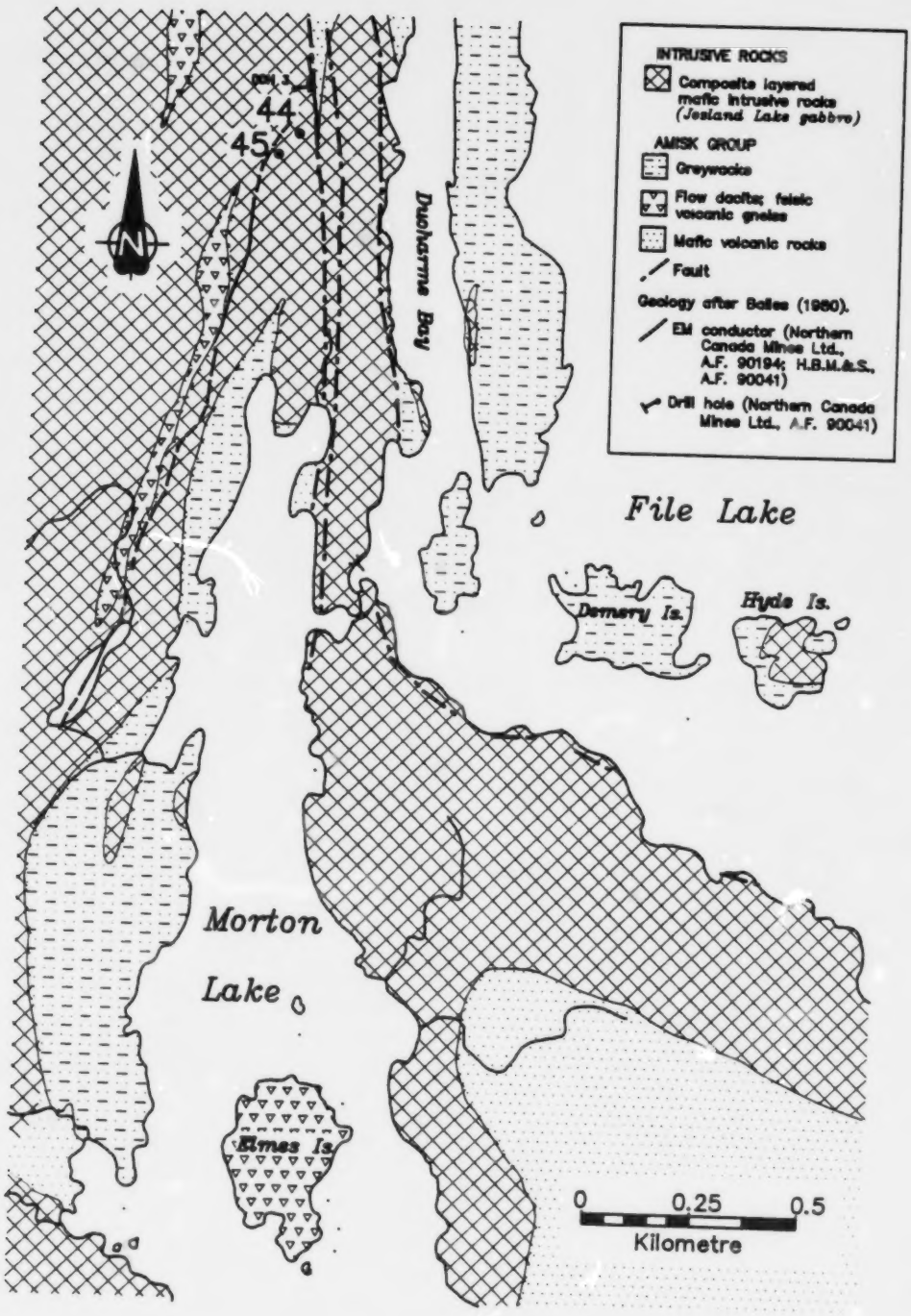



*Figure 44-1: Geological setting of occurrences 44 and 45*

**LOCATION: 44**

**NAME: COPPER VALLEY**
**UTM: 6082440N/407276E**
**ACCESS: Bush aircraft/traverse.**

**AREA: West of Ducharme Bay (File Lake)**
**AIRPHOTO: A26367-61**

EXPLORATION SUMMARY:

Mineralization exposed at occurrences 44 and 45 (Fig. 44-1) are referred to as the Copper Valley sulphide deposit by Wright (1930). Wright (1930) also reported that the mineralization was tested by two DDHs and trenching by C.E. Herman and a Mr. Bartlett in the winter of 1930. In 1956 Northern Canada Mines Limited conducted a horizontal loop survey over this area (A.F. 90194) that outlined a number of north-northwest trending conductors in the vicinity of the mineralization (Fig. 44-1). Northern Canada Mines Ltd. conducted follow-up drilling in 1957 (A.F. 90202). One DDH (DDH 3) tested a 150 m long conductor that is situated approximately 200-250 m northeast of the occurrences (Fig. 44-1). HBM&S conducted an EM survey on the area in 1956 and 1957 (A.F. 90041). Occurrences 44 and 45 occur near the north end of a north-northeast trending 2 km EM anomaly (Fig. 44-1). The area is presently (1988) covered by claim File 3 (W 47569) held by Varna Gold Incorporated.

GEOLOGICAL SETTING:

The mineralization occurs within a sliver of mafic volcanic gneiss in an area underlain by intrusive rocks of the Josland Lake gabbro (Wright, 1930; Stockwell, 1935; Harrison, 1949; Bailes, 1980; Ostry, 1984).

MINERALIZATION:

One trench was located at occurrence 44 (Fig. 44-2). An extremely fine grained, mafic rock, possibly a cataclasite, with blotchy fine- to coarse-grained metamorphic growths of pyrite and pyrrhotite (less than 5% of rock) is exposed in the trench.

GEOCHEMICAL DATA:

A bulk sample of mineralized rock from occurrence 44 (Fig. 44-3) contained 0.09% Cu (Appendix I).

CLASSIFICATION:

Disseminated mineralization - not classified.

REFERENCES:


Assessment Files 90041, 90194, 90202
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping lakes area, Manitoba; Geological Survey of Canada, Memoir 250, p. 66.

Ostry, G.
1984: Mineral occurrence studies in the File Lake area of Manitoba; In Manitoba Mineral Resources Division, Report of Field Activities 1984, p. 53-59.

Stockwell, C.H.
1935: Gold deposits of Elbow-Morton Lake area, Manitoba; Canada Department of Mines, Memoir 186.

Wright, J.F.
1930: Geology of mineral deposits of a part of northwest Manitoba; Canada Department of Mines and Resources Summary Report, 1930, Part C, p. 67c-68c.

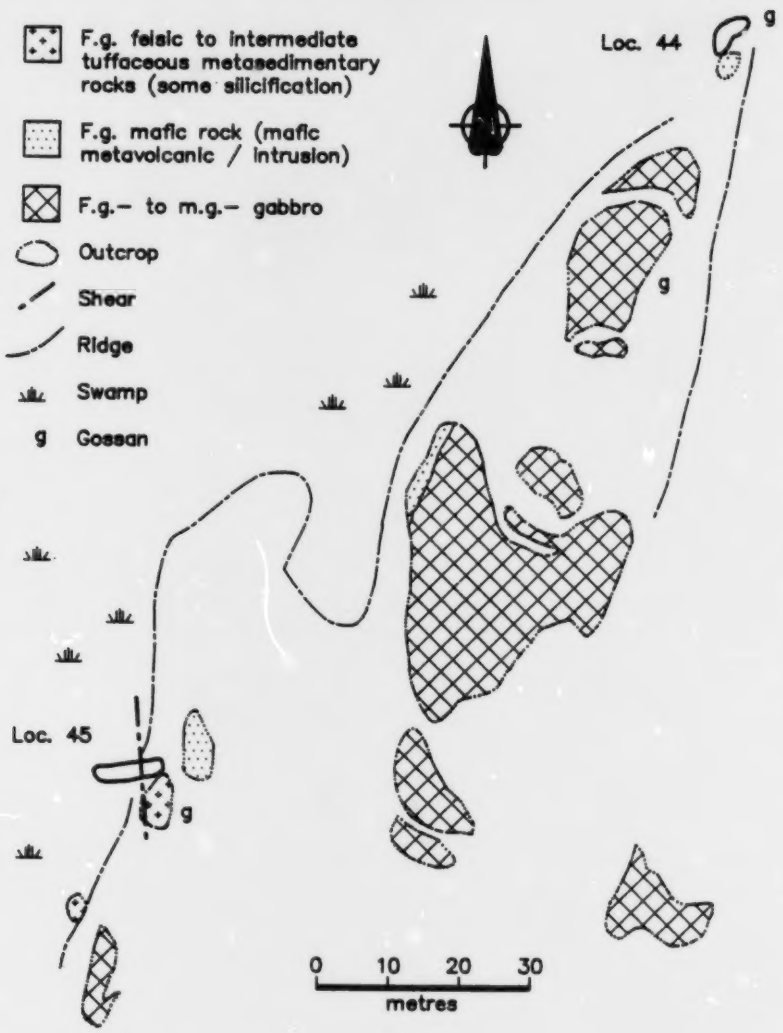



*Figure 44-2: Outcrop distribution, geology, trench and sample locations at occurrences 44 and 45*

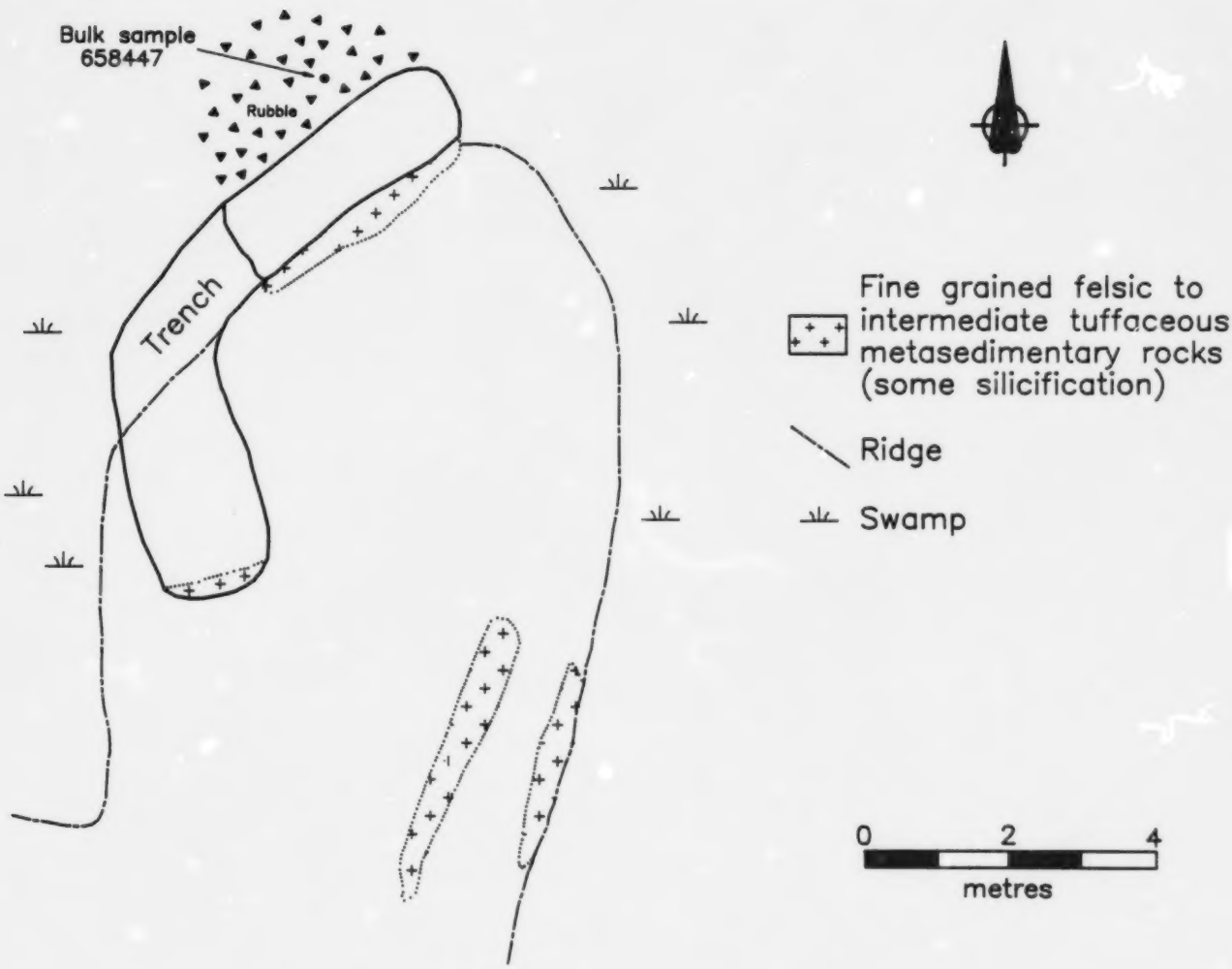



*Figure 44-3: Outcrop distribution, geology, trench and sample locations at occurrence 44*

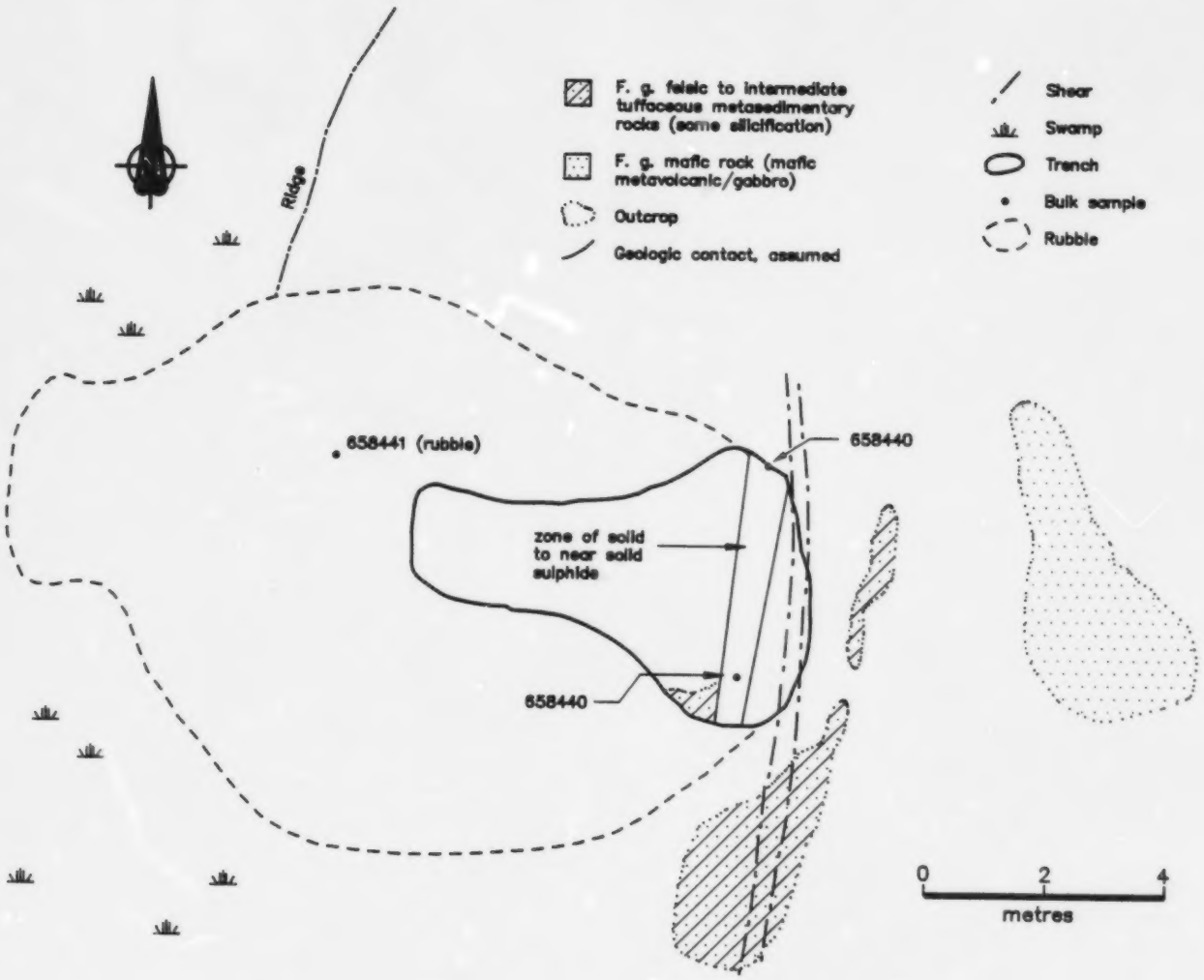



*Figure 45-1: Outcrop distribution, geology, trench and sample locations at occurrence 45*

**LOCATION: 45**

**NAME: COPPER VALLEY**
**UTM: 6082325N/407221E**
**ACCESS: Bush aircraft/traverse.**

**AREA: West of Ducharme Bay (File Lake)**
**AIRPHOTO: A26367-61**

EXPLORATION SUMMARY:

Mineralization exposed at occurrences 44 and 45 (Fig. 44-1) are referred to as the Copper Valley sulphide deposit by Wright (1930). Wright (1930) also reports that the mineralization was tested by two DDHs and trenching by C.E. Herman and a Mr. Bartlett in the winter of 1930. In 1956 Northern Canada Mines Limited conducted a horizontal loop survey over this area (A.F. 90194) that outlined a number of north-northwest trending conductors in the vicinity of the mineralization (Fig. 44-1). Northern Canada Mines Ltd. conducted follow-up drilling in 1957 (A.F. 90202). One DDH (DDH 3) tested a 150 m long conductor that is situated approximately 200-250 m northeast of the occurrences (Fig. 44-1). HBM&S conducted an EM survey on the area in 1956 and 1957 (A.F. 90041). Occurrences 44 and 45 occur near the north end of a north-northeast trending 2 km long EM anomaly (Fig. 44-1). The area is presently (1988) covered by claim File 3 (W 47569) held by Varna Gold Incorporated.

GEOLOGICAL SETTING:

The mineralization occurs within a sliver of mafic volcanic gneiss in an area underlain by intrusive rocks of the Josland Lake gabbro (Wright, 1930; Stockwell, 1935; Harrison, 1949; Bailes, 1980; Ostry, 1984).

MINERALIZATION:

One trench was located at occurrence 45 (Fig. 44-2). Solid and near solid Fe-sulphide interlayered with very fine grained felsic chemical/tuffaceous sedimentary gneiss was observed in the trench at occurrence 45 (Fig. 45-1). Pyrrhotite is the dominant sulphide, locally accompanied by lensoid, coarse grained metamorphic pyrite. Minor chalcopyrite constitutes up to 1% of the unit and occurs as distinct grains and/or as fracture-controlled mobilizate. The sulphide-rich unit(s) contains a very fine grained quartz-biotite-chlorite assemblage (pelite) that forms less than 1 cm thick continuous and discontinuous (en echelon) bands suggestive of primary layering. Maximum observed thickness of a single metasedimentary layer was 0.7 m; however, pervasive oxidation has effaced all sulphide-rich rock exposure limiting data collection in most cases to examination of rubble adjacent to the trenches.

Visible alteration in and around this sulphide zone(s) is rare except for local silicification and/or potassium alteration that is attributed to a late shearing event. The style of mineralization at occurrence 45 is similar to that observed at the other solid to near solid Fe-sulphide occurrences in the File Lake area. The presence of mafic metavolcanic rocks immediately to the north, the north-south trending regional strike of those mafic rocks (and the sill-like gabbro) and the position of this occurrence at the north end of a north-trending 2 km EM anomaly would indicate that it most likely represents a conformable sulphide zone within a mafic metavolcanic sequence.

GEOCHEMICAL DATA:

Two grab samples were taken for geochemical analysis (Fig. 45-1). Sample 658441 contained 0.05% Cu and 6 ppb Au (Appendix I). Sample 658444 contained 0.07% Cu.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation.

REFERENCES:


Assessment Files 90041, 90194, 90202
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping lakes area, Manitoba; Geological Survey of Canada, Memoir 250.

Ostry, G.
1984: Mineral occurrence studies in the File Lake area of Manitoba; In Manitoba Mineral Resources Division, Report of Field Activities 1984, p. 53-59.

Stockwell, C.H.
1935: Gold deposits of Elbow-Morton Lake area, Manitoba; Canada Department of Mines, Memoir 186.

Wright, J.F.
1930: Geology of mineral deposits of a part of northwest Manitoba; Canada Department of Mines and Resources, Summary Report, 1930, Part C.

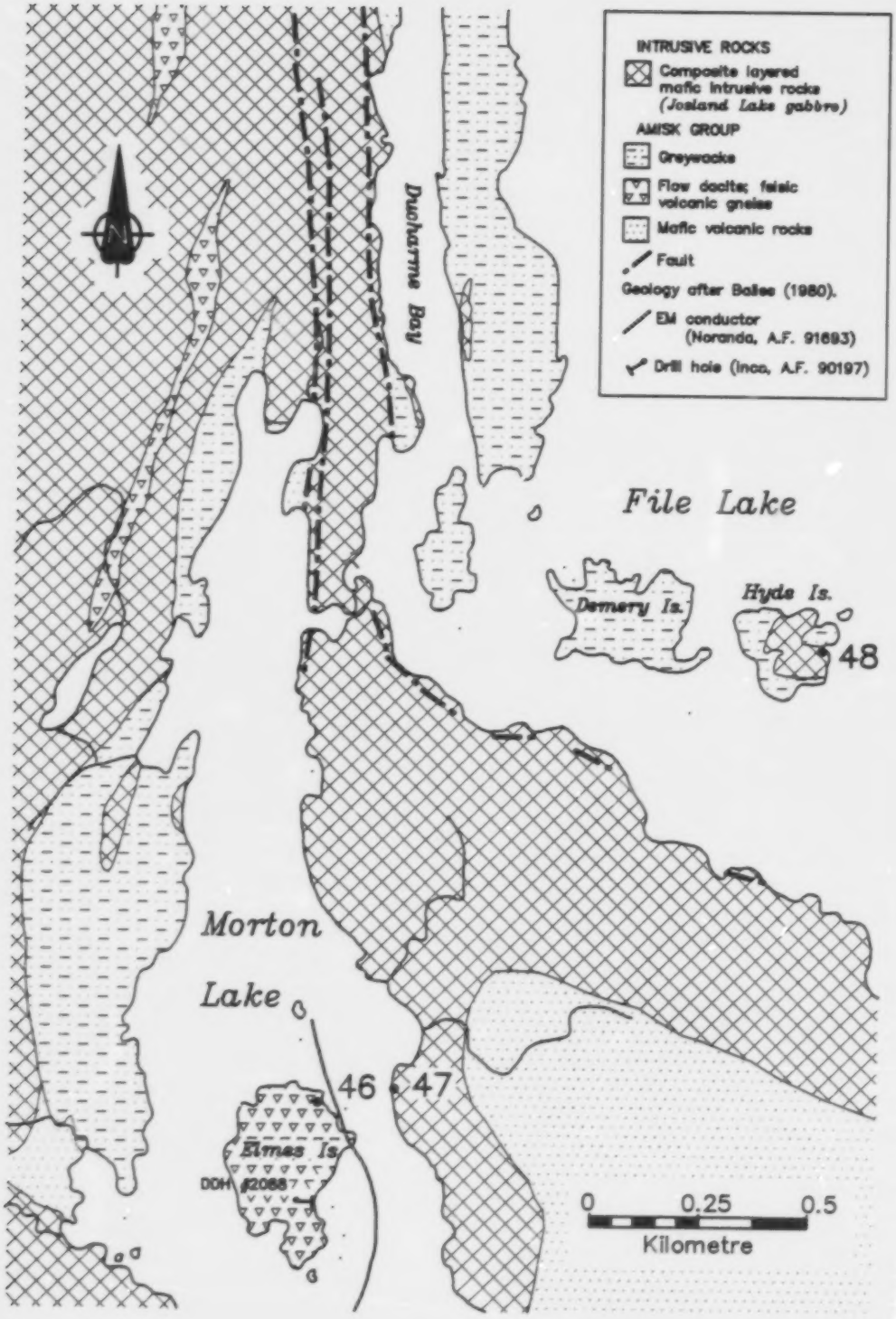



*Figure 46-1: Geological setting of occurrences 46, 47 and 48*

**LOCATION: 46**

**NAME:**
**UTM: 6078036N/407538E**
**ACCESS: Bush aircraft.**

**AREA: Elmes Island, Morton Lake**
**AIRPHOTO: A26367-59**

EXPLORATION SUMMARY:

In 1951 Inco completed one drill hole on Elmes Island (A.F. 90197) south of location 46 (Fig. 46-1). The drill hole intersected disseminated pyrite and pyrrhotite mineralization associated with chlorite-talc-sericite schist and pyrite-graphite layers associated with argillaceous metasedimentary rocks. In 1956, HBM&S conducted a horizontal loop EM survey (A.F. 90043) that included the north portion of Elmes Island. Conductive zones were not detected in the vicinity of occurrence 45. Three trenches were located (Fig. 46-2). The area is presently (1988) covered by CB 5089 held by HBED.

GEOLOGICAL SETTING:

The area is underlain by dacitic metavolcanic rocks (Bailes, 1980).

MINERALIZATION:

Three small trenches at the north end of Elmes Island on Morton Lake (Fig. 46-2) expose a dark, very fine grained graphite- and pyrite-bearing metasedimentary unit. Very fine grained disseminated grains of pyrite constitute up to 50% of these rocks (Bailes, 1980). Acicular, less than 2 cm, pyrite grains aligned in the plane of foliation are locally common and constitute up to 10% of the rock. A fine grained dacite breccia cut by a network of darker siliceous material (recrystallized ash matrix?) with less than 1% pyrrhotite and/or pyrite hosts the pyrite/graphite unit. The dacite breccia is interlayered with a massive metadacite characterized by actinolite porphyroblasts. Sulphide content in the dacitic unit is up to 5%, mainly as pyrrhotite and/or pyrite disseminations and rarely as less than 1 mm pyrite/pyrrhotite streaks in the plane of foliation.

GEOCHEMICAL DATA:

A grab sample (Fig. 46-2) from the pyrite/graphite unit contained 0.01% Cu (Appendix I).

CLASSIFICATION:

Chemical sediment-type deposit. Graphite-pyrite (earthy pyrite).

REFERENCES:

Assessment Files 90043, 90197
Manitoba Energy and Mines, Mineral Division

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

Ostry, G.
1984: Mineral occurrence studies in the File Lake area of Manitoba; In Manitoba Mineral Resources Division, Report of Field Activities 1984, p. 53-59.

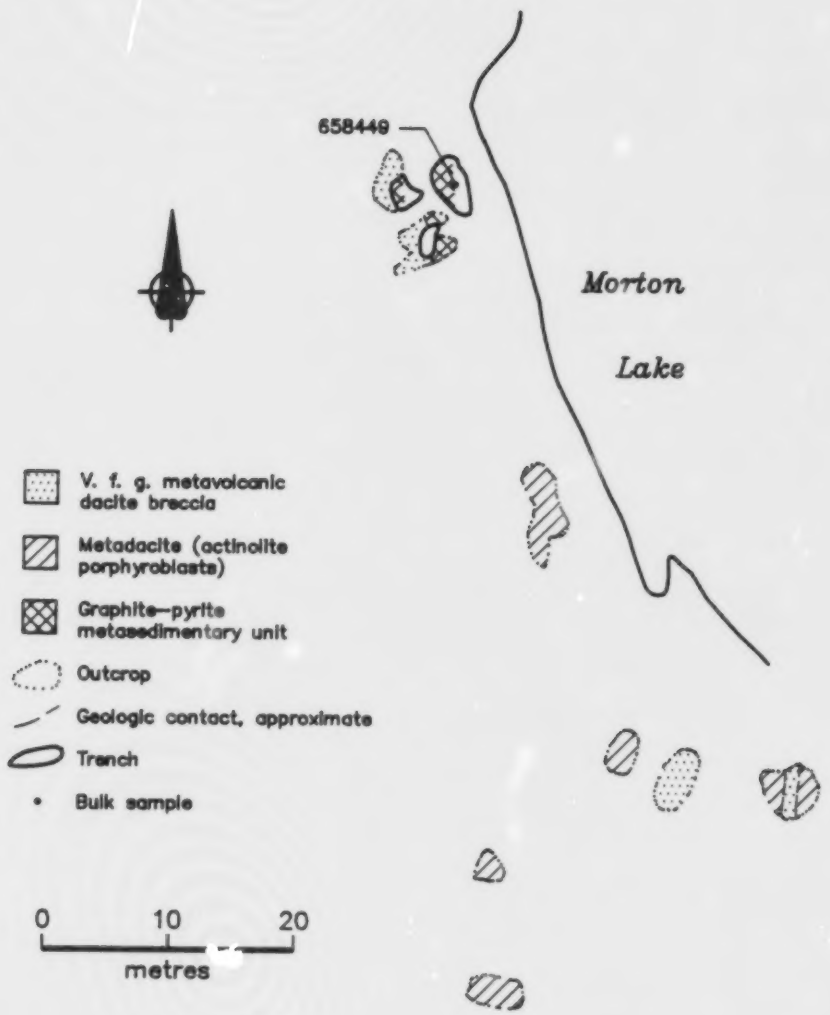



*Figure 46-2: Outcrop distribution, geology, trench and sample locations at occurrence 46*

**LOCATION: 47**

**NAME:**
**UTM: 6078079N/407847E**
**ACCESS: Bush aircraft.**

**AREA: East shore of Morton Lake (Fig. 46-1)**
**AIRPHOTO: A26367-59**

EXPLORATION HISTORY:

In 1956 HBM&S conducted a horizontal loop EM survey (A.F. 90043) that included the area in and around location 47 (Fig. 46-1). Conductive zones were not detected in the vicinity. Disseminated Fe-sulphide mineralization was noted by Bailes (1980). One trench was located (Ostry, 1984). The area is presently (1988) covered by CB 5089 held by HBED.

GEOLOGICAL SETTING:

The area is underlain by gabbroic intrusive rocks (Harrison, 1949; Bailes, 1980). At occurrence 47 a medium grained quartz-feldspar porphyry has intruded the Josland Lake gabbro (Fig. 47-1).

MINERALIZATION:

Emplacement of the porphyry has been accompanied locally by intense shearing, carbonatization, potassium enrichment, silicification and mobilization of pyrrhotite, pyrite and/or chalcopyrite onto fracture surfaces and into the shear foliation as blebs, streaks and disseminations. The sulphide content rarely exceeds 5%.

GEOCHEMICAL DATA:

Two grab samples were taken for geochemical analysis: one from the sheared, altered and mineralized zone and the other from the quartz-feldspar porphyry outside of the mineralized zone (Fig. 47-1).

Sample 658437A from the shear zone contained 0.07% Cu, 16 ppb Au and 6 ppm molybdenum (Appendix I).

CLASSIFICATION:

Disseminated sulphide occurrence - not classified.

REFERENCES:


Assessment File 90043
Manitoba Energy and Mines, Mineral Division

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping lakes area, Manitoba; Geological Survey of Canada, Memoir 250, 92 p.

Ostry, G.
1984: Mineral occurrence studies in the File Lake area of Manitoba; In Manitoba Mineral Resources Division, Report of Field Activities 1984, p. 53-59.

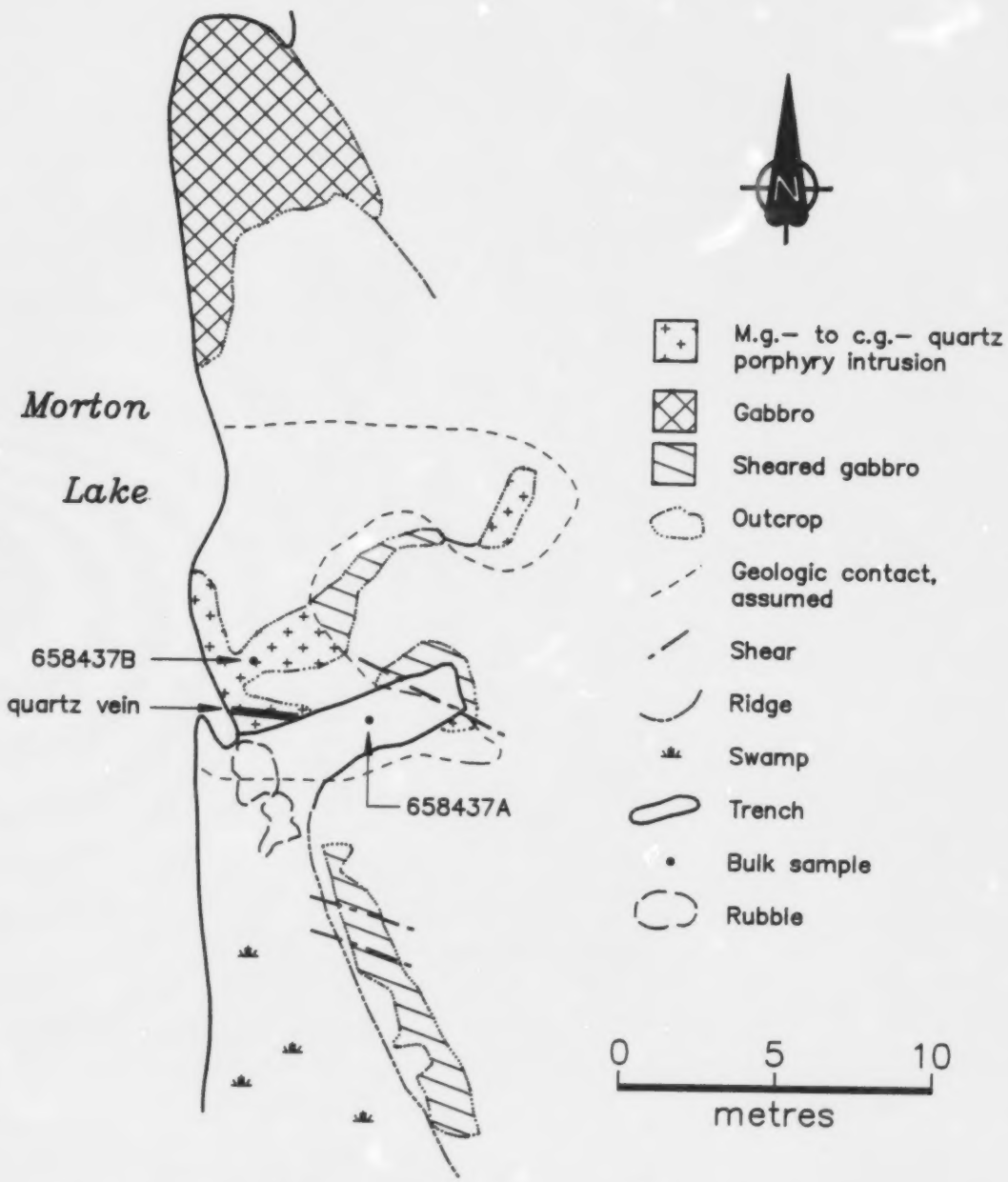



*Figure 47-1: Outcrop distribution, geology, trench and sample locations at occurrence 47*

**LOCATION: 48**

**NAME:**
**UTM: 6080084N/409776E**
**ACCESS: Bush aircraft.**

**AREA: File Lake (Fig. 46-1)**
**AIRPHOTO: A26323-117**

EXPLORATION SUMMARY:

Arsenopyrite and chalcopyrite mineralization at occurrence 48 (Fig. 46-1) was noted by Bailes (1980). The area is presently (1988) covered by the MOR 1 claim (P. 6825E) held by Varna Gold Incorporated.

GEOLOGICAL SETTING:

The mineralization at occurrence 48 occurs within the Josland Lake gabbro (Bailes, 1980) near an intrusive contact with the File Lake metagreywacke formation.

MINERALIZATION:

This locality contains up to 10% sulphides consisting predominantly of pyrrhotite with lesser arsenopyrite, pyrite and chalcopyrite that occurs along fractures within sheared and locally intensely granulated gabbro/quartz diorite (Ostry, 1984). Although exposure is limited, the mineralized section appears to be about 1-2 m wide. Visible alteration includes the development of biotite along the mineralized fractures and abundant Fe-staining.

GEOCHEMICAL DATA:

A grab sample of the mineralized gabbro (Fig. 48-1) contained 425 ppb Au (Appendix I).

CLASSIFICATION:

Disseminated sulphide occurrence - not classified.

REFERENCES:

Bailes, A.H.

1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

Ostry, G.

1984: Mineral occurrence studies in the File Lake area of Manitoba; In Manitoba Mineral Resources Division, Report of Field Activities 1984, p. 53-59.

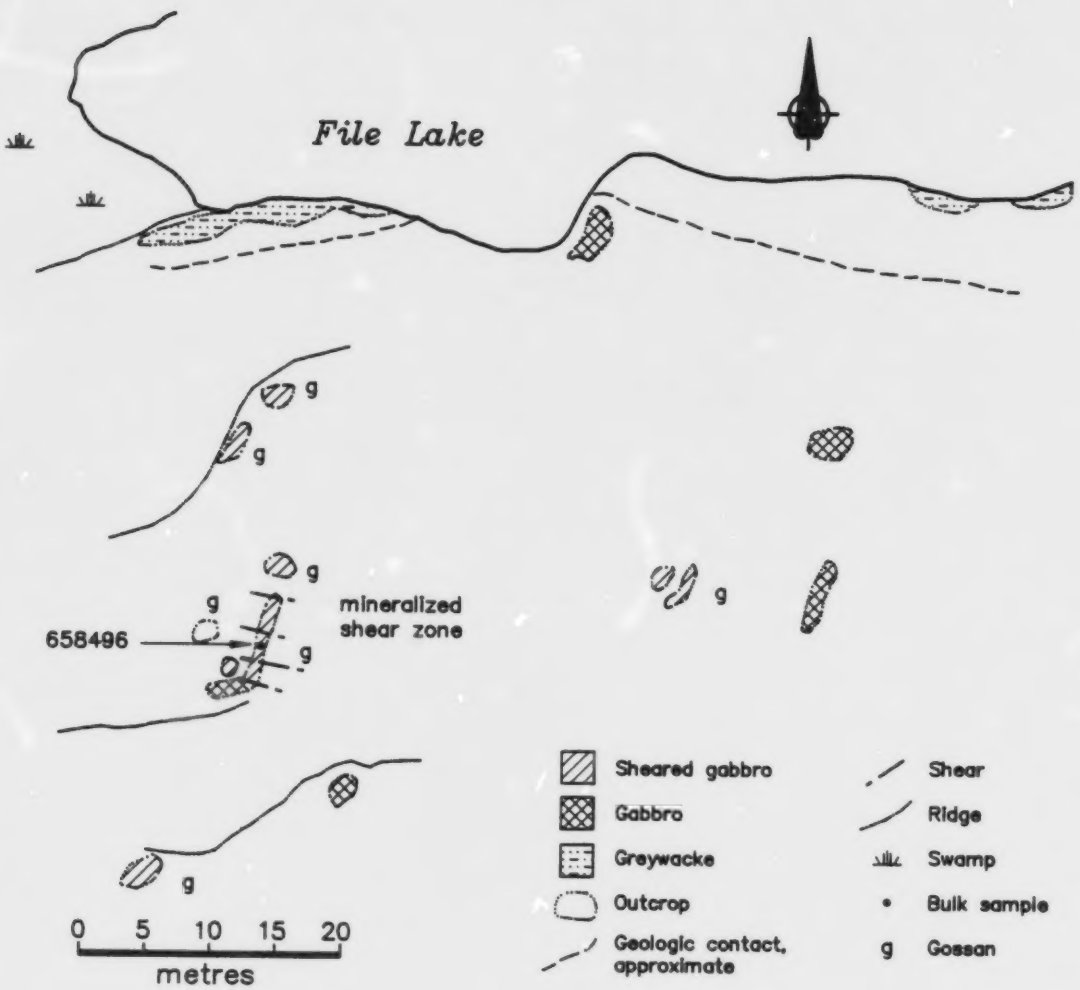



*Figure 48-1: Outcrop distribution, geology, trench and sample locations at occurrence 48*

**LOCATION: 49**

**NAME: GORDON LAKE**
**UTM: 6081330N/405595E**
**ACCESS: Bush aircraft.**

**AREA: Josland Lake**
**AIRPHOTO: A26368-86**

EXPLORATION SUMMARY:

Occurrence 49 (Fig. 49-1) is referred to as the Gordon Lake property on Mineral Inventory Card 63K/16 Pyr 5. Sureshot 1 was the first recorded claim over the occurrence. Fe-sulphide mineralization in the area was noted by Wright (1930), Stockwell (1935), Harrison (1949) and Bailes (1980). HBM&S conducted an EM survey over the area in 1956 (A.F. 90041) and detected an approximately 2.6 km long conductor that extends from north of Josland Lake along its east shore to south of the lake (Fig. 49-1). In 1953 HBM&S completed three drill holes (DDHs 4, T-2, T-3; A.F. 90057) and in 1956 completed seven additional drill holes (DDHs 24, 26, 33, 35; A.F. 90056 and DDHs 15, 17, 30; A.F. 90495) along the conductive zone (Fig. 49-1). Falconbridge Nickel Mines Limited conducted magnetometer and AFMAG-Longwire surveys over the area in 1966 (A.F. 92112). Coincident magnetic and conductive zones are located over the mineralization. Two trenches were located (Fig. 49-2). The area is presently (1988) covered by CB 10504 held by HBED.

GEOLOGICAL SETTING:

The area is underlain by intermediate to mafic metavolcanic and reworked metavolcanic rocks (Wright, 1930; Stockwell, 1935; Harrison, 1949; Bailes, 1980; Ostry, 1984).

MINERALIZATION:

The mineralization comprises conformable layers of solid and near solid Fe-sulphide intercalated with felsic to intermediate chemical/tuffaceous sedimentary gneiss that form a zone on the order of meters to tens of meters in thickness (Ostry, 1984). Pyrrhotite is the dominant sulphide and is commonly accompanied by coarse grained pyrite that is lensoid in places. Minor chalcopyrite constitutes up to 1% of the unit and occurs as distinct grains and/or as fracture-controlled mobilizate.

Locally the sulphide-rich rock contains a very fine grained quartz-biotite-chlorite assemblage (pelite) that forms thin continuous bands (less than 1 cm across) suggestive of primary layering. Visible alteration in and around the sulphide zones is rare except for local silicification that is attributed to a late shearing event.

Mineralization intersected by HBM&S drilling consists of layers up to 2 m thick of disseminated to massive pyrrhotite and pyrite, plus minor chalcopyrite, intercalated with intermediate and felsic metavolcanic rocks. Quartz-carbonate stringers and carbonatization of the intermediate metavolcanic rocks were observed locally in the drill core. Drill holes 4 and T-3 (A.F. 90057) intersected specks and stringers of sphalerite within a 'siliceous chloritic andesite' over 1.5 m.

GEOCHEMICAL DATA:

A grab sample of massive pyrrhotite from the rubble at the northern trench (Fig. 49-2) contains 0.1% Cu, 0.18 % Zn and 8 ppb Au (Appendix I).

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation. The specks and stringers of sphalerite within a 'siliceous chloritic andesite' intersected in DDHs 4 and T-3 is suggestive of alteration commonly associated with massive sulphide-type deposits.

REFERENCES:


Assessment Files 90041, 90056, 90057, 90495, 92112
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping lakes area, Manitoba; Geological Survey of Canada, Memoir 250, 92 p.

Mineral Inventory Card 63K/16 Pyr 5
Manitoba Energy and Mines, Minerals Division.

Ostry, G.
1984: Mineral occurrence studies in the File Lake area of Manitoba; In Manitoba Mineral Resources Division, Report of Field Activities 1984, p. 53-59.

Stockwell, C.H.
1935: Gold deposits of Elbow-Morton Lake area, Manitoba; Canada Department of Mines, Memoir 186.

Wright, J.F.
1930: Geology of mineral deposits of a part of northwest Manitoba; Canada Department of Mines and Resources, Summary Report, 1930, Part C.

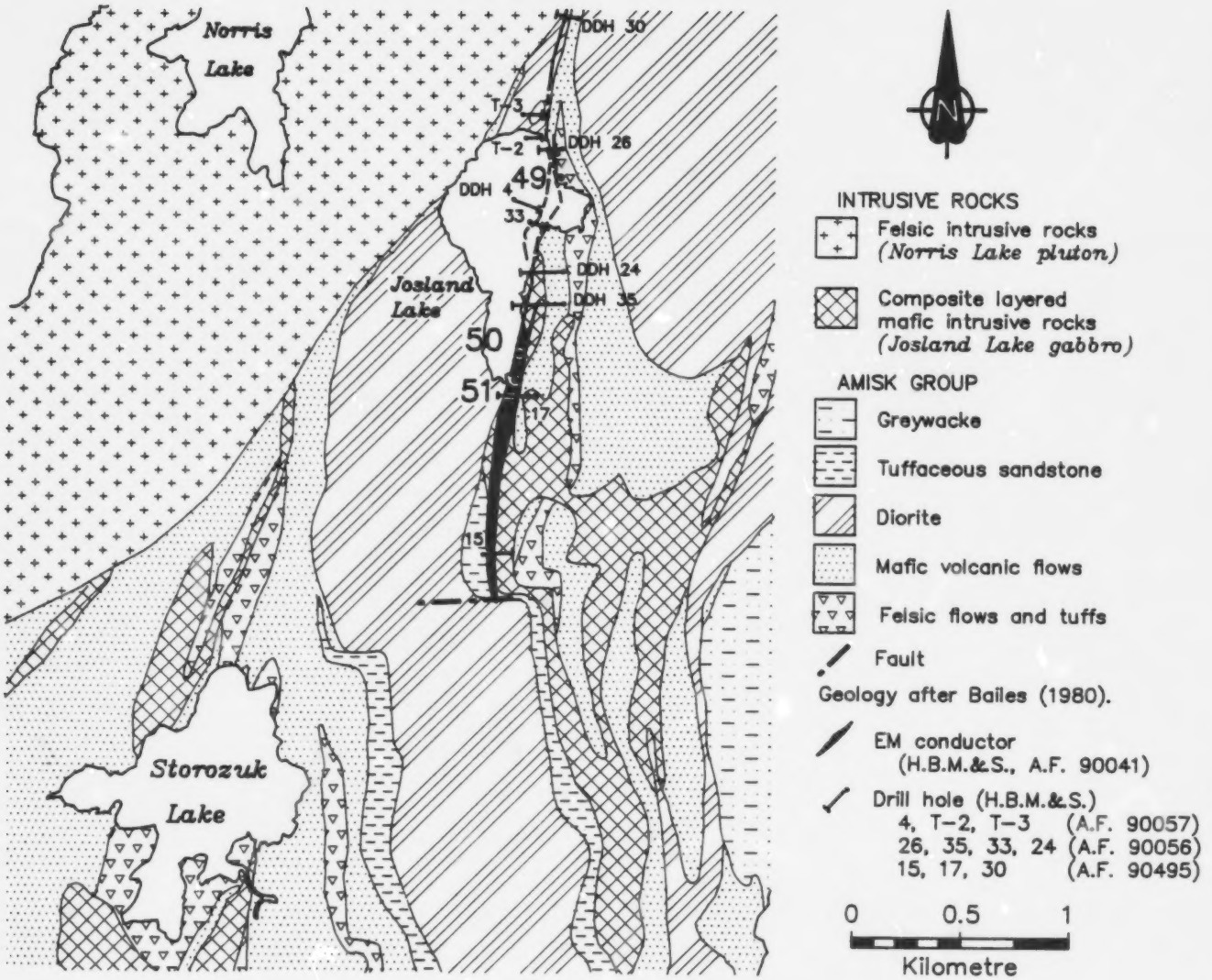



*Figure 49-1: Geological setting of occurrences 49, 50 and 51*

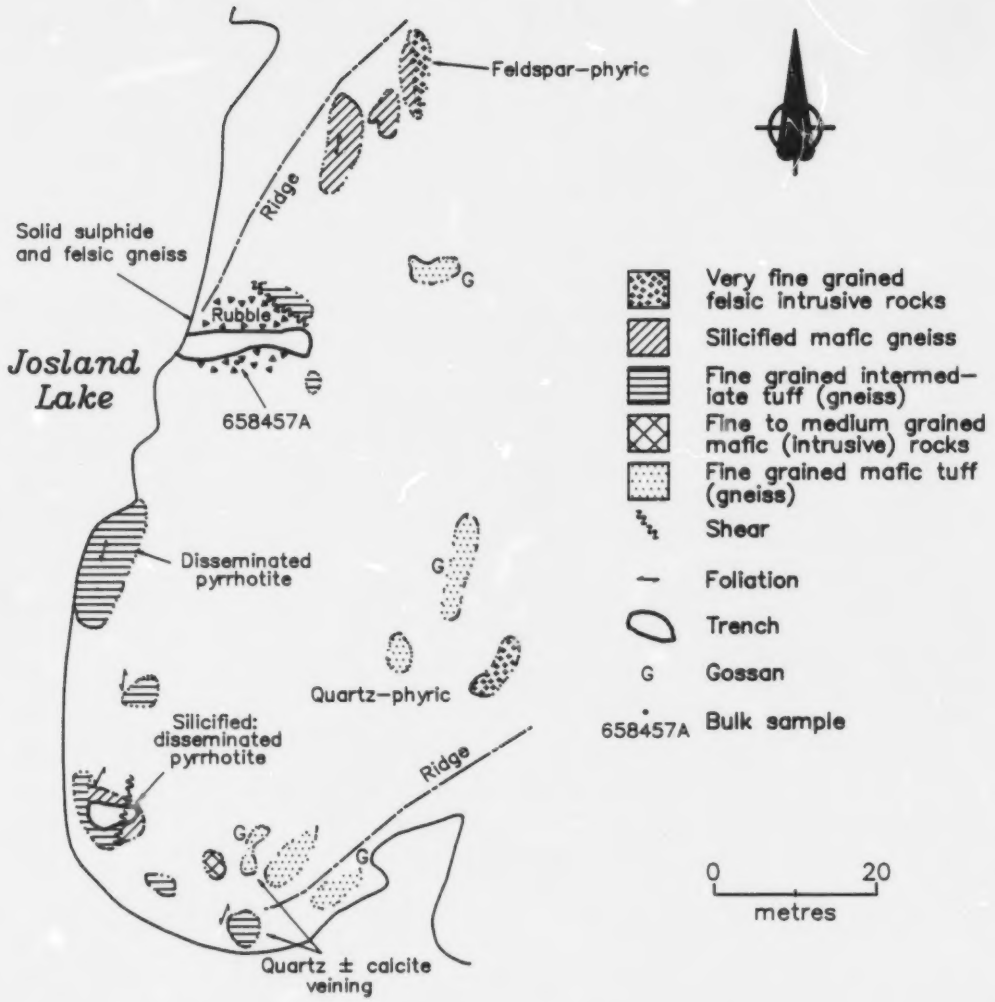



*Figure 49-2: Outcrop distribution, geology, trench and sample locations at occurrence 49*

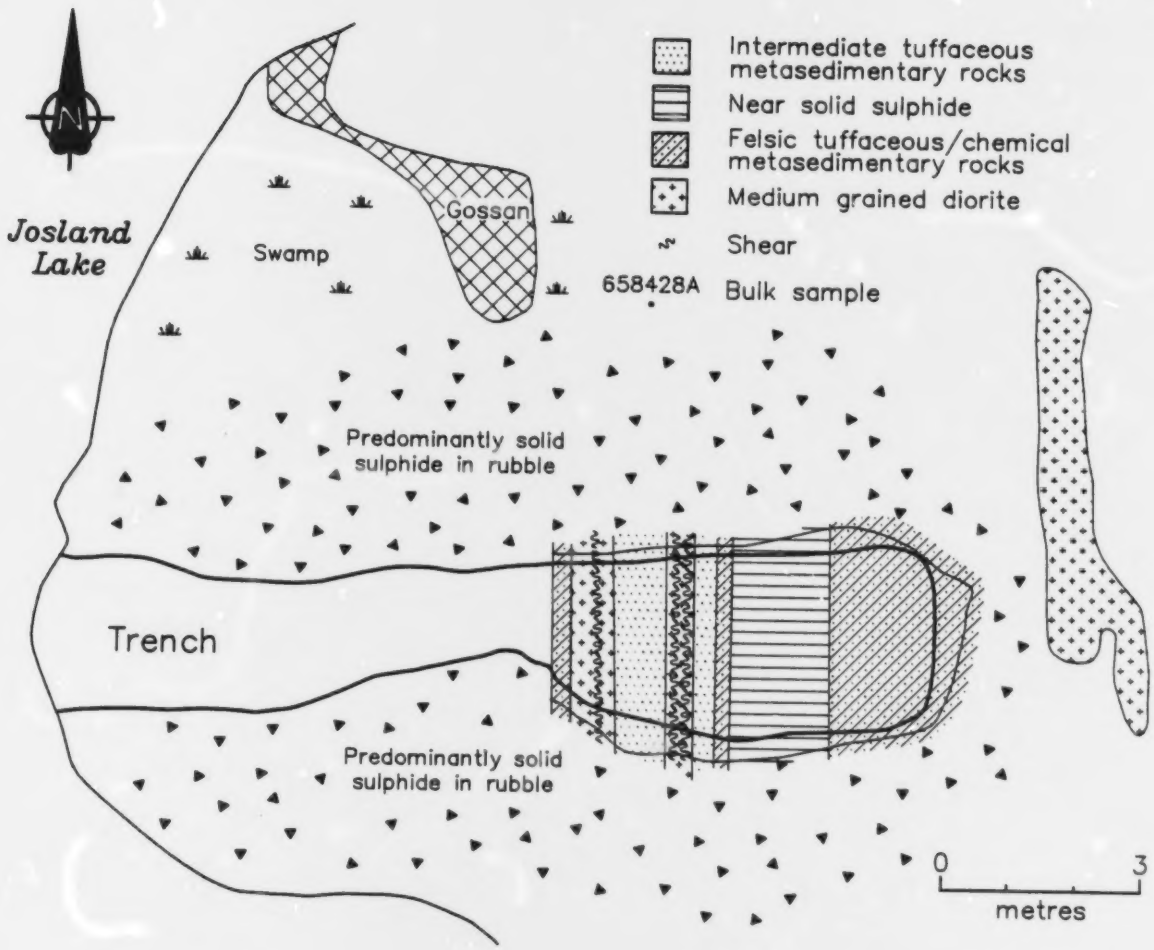



*Figure 50-1: Detailed geology, trench and sample locations at occurrence 50*

**LOCATION: 50**

**NAME:**
**UTM: 6080493N/405356E**
**ACCESS: Bush aircraft.**

**AREA: Josland Lake (Fig. 49-1**
**AIRPHOTO: A26368-86**

EXPLORATION SUMMARY:

Fe-sulphide mineralization in the area was noted by Wright (1930), Stockwell (1935), Harrison (1949) and Bailes (1980). HBM&S conducted an EM survey over the area in 1956 (A.F. 90041) and detected an approximately 2.6 km long conductor that extends from north of Josland Lake along its east shore to south of the lake (Fig. 49-1). In 1953 HBM&S completed three drill holes (DDHs 4, T-2, T-3; A.F. 90057) and in 1956 completed seven additional drill holes (DDHs 24, 26, 33, 35; A.F. 90056 and DDHs 15, 17, 30; A.F. 90495) along the conductive zone (Fig. 49-1). Falconbridge Nickel Mines Limited conducted magnetometer and AFMAG-Longwire surveys over the area in 1966 (A.F. 92112), however anomalous results were not obtained in the vicinity of occurrence 50. One trench was located, however the date of the work performed is not known. The area is presently (1988) covered by claim STA 4243 (P 4243E) held by HBED.

GEOLOGICAL SETTING:

The area is underlain by intermediate to mafic metavolcanic and reworked metavolcanic rocks (Wright, 1930; Stockwell, 1935; Harrison, 1949; Bailes, 1980; Ostry, 1984).

MINERALIZATION:

The mineralization consists of conformable layers of solid and near solid Fe- sulphide intercalated with felsic to intermediate chemical/tuffaceous sedimentary gneiss (Ostry, 1984). Pyrrhotite is the dominant sulphide and is locally accompanied by coarse grained pyrite. Chalcopyrite constitutes up to 1% of the unit and occurs as distinct grains and/or as fracture-controlled mobilizate.

The majority of the sulphide-rich rock contains a very fine grained quartz-biotite-chlorite assemblage (pelite) that forms thin continuous bands (less than 1 cm) suggestive of primary layering. Sulphide-rich rocks range from a sulphidic biotite-chlorite schist to solid sulphide with variations in the relative abundances of sulphide, pelitic material and silicates.

Very fine grained felsic to intermediate metasedimentary rocks (gneiss), commonly containing disseminated fine grained pyrrhotite, host the sulphide-rich units and form distinct conformable zones within the mafic metavolcanic rocks. Maximum observed thickness of a single metasedimentary bed was 1.5 m; however, pervasive oxidation has effaced all sulphide-rich rock exposure limiting data collection in most cases to examination of rubble adjacent to trenches. In thin section amphibole-sulphide-rich zones (beds?) were observed on the order of less than a centimeter in thickness within the very fine grained felsic rock, possibly indicating a chemical sedimentary component.

This conformable zone is envisaged to be on the order of metres to possibly tens of metres in thickness. Visible alteration in and around the sulphide zones is rare, except for local silicification that is attributed to a late shearing event.

Mineralization intersected by HBM&S drilling consists of layers up to 2 m thick of disseminated to massive pyrrhotite and pyrite, plus slight chalcopyrite, intercalated with intermediate and felsic metavolcanic rocks. Quartz-carbonate stringers and carbonatization of the intermediate metavolcanic rocks were observed locally in the drill core. Drill hole 15 (A.F. 90495) intersected trace sphalerite associated with pyrrhotite mineralization.

GEOCHEMICAL DATA:

A geochemical analysis of a grab sample of massive pyrrhotite from the rubble adjacent to the trench (Fig. 50-1) contained 0.05 % Cu and 14 ppb Au (Appendix I).

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation.

REFERENCES:


Assessment Files 90041, 90056, 90057, 90495, 92112
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping lakes area, Manitoba; Geological Survey of Canada, Memoir 250, 92 p.

Ostry, G.
1984: Mineral occurrence studies in the File Lake area of Manitoba; In Manitoba Mineral Resources Division, Report of Field Activities 1984, p. 53-59.

Stockwell, C.H.

1935: Gold deposits of Elbow-Morton Lake area, Manitoba; Canada Department of Mines, Memoir 186.

Wright, J.F.

1930: Geology of mineral deposits of a part of northwest Manitoba; Canada Department of Mines and Resources, Summary Report, 1930, Part C.

**LOCATION: 51**

**NAME:**
**UTM: 6080383N/405335E**
**ACCESS: Bush aircraft.**

**AREA: Josland Lake (Fig. 49-1)**
**AIRPHOTO: A26368-86**

EXPLORATION SUMMARY:

Fe-sulphide mineralization in the area was noted by Wright (1930), Stockwell (1935), Harrison (1949) and Bailes (1980). HBM&S conducted an EM survey over the area in 1956 (A.F. 90041) and detected an approximately 2.6 km long conductor that extends from north of Josland Lake along its east shore to south of the lake (Fig. 49-1). In 1953 HBM&S completed three drill holes (DDHs 4, T-2, T-3; A.F. 90057) and in 1956 completed seven additional drill holes (DDHs 24, 26, 33, 35; A.F. 90056 and DDHs 15, 17, 30; A.F. 90495) along the conductive zone (Fig. 49-1). Falconbridge Nickel Mines Limited conducted magnetometer and AFMAG-Longwire surveys over the area in 1966 (A.F. 92112), but anomalous results were not obtained in the vicinity of occurrence 51. An open shaft was located, however the date of the work performed is not known. The area is presently (1988) covered by CB 10811 held by HBED.

GEOLOGICAL SETTING:

The area is underlain by intermediate to mafic metavolcanic and reworked metavolcanic rocks (Wright, 1930; Stockwell, 1935; Harrison, 1949; Bailes, 1980; Ostry, 1984).

MINERALIZATION:

The mineralization consists of solid and near solid Fe-sulphide associated with felsic to intermediate chemical/tuffaceous metasedimentary gneiss (Ostry, 1984). Pyrrhotite is the dominant sulphide and is commonly accompanied by coarse grained pyrite that is locally lensoid. Minor chalcopyrite constitutes up to 1% of the unit and occurs as distinct grains and/or as fracture-controlled mobilizate. Data collection at locality 51 was limited to investigation of rubble adjacent to the shaft. All sulphide-rich rock is effaced by oxidation.

A very fine grained quartz-biotite-chlorite assemblage (pelite) that forms thin continuous bands (less than 1 cm across) suggestive of primary layering was observed within pieces of massive pyrrhotite.

Mineralization intersected by the HBMS drilling consists of layers up to 2 m thick of disseminated to massive pyrrhotite and pyrite, plus slight chalcopyrite intercalated with intermediate and felsic metavolcanic rocks. Quartz-carbonate stringers and carbonatization of the intermediate metavolcanic rocks were observed locally in the drill core. Drill hole 15 (A.F. 90495) intersected trace sphalerite associated with pyrrhotite mineralization.

GEOCHEMICAL DATA:

A grab sample (658428B) of massive pyrrhotite from the rubble adjacent to the shaft contained 0.08% Cu, 248 ppm As and 84 ppb Au (Appendix I).

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation.

REFERENCES:


Assessment Files 90041, 90056, 90057, 90495, 92112
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping lakes area, Manitoba; Geological Survey of Canada, Memoir 250, 92 p.

Ostry, G.
1984: Mineral occurrence studies in the File Lake area of Manitoba; In Manitoba Mineral Resources Division, Report of Field Activities 1984, p. 53-59.

Stockwell, C.H.
1935: Gold deposits of Elbow-Morton Lake area, Manitoba; Canada Department of Mines, Memoir 186.

Wright, J.F.
1930: Geology of mineral deposits of a part of northwest Manitoba; Canada Department of Mines and Resources, Summary Report, 1930, Part C.

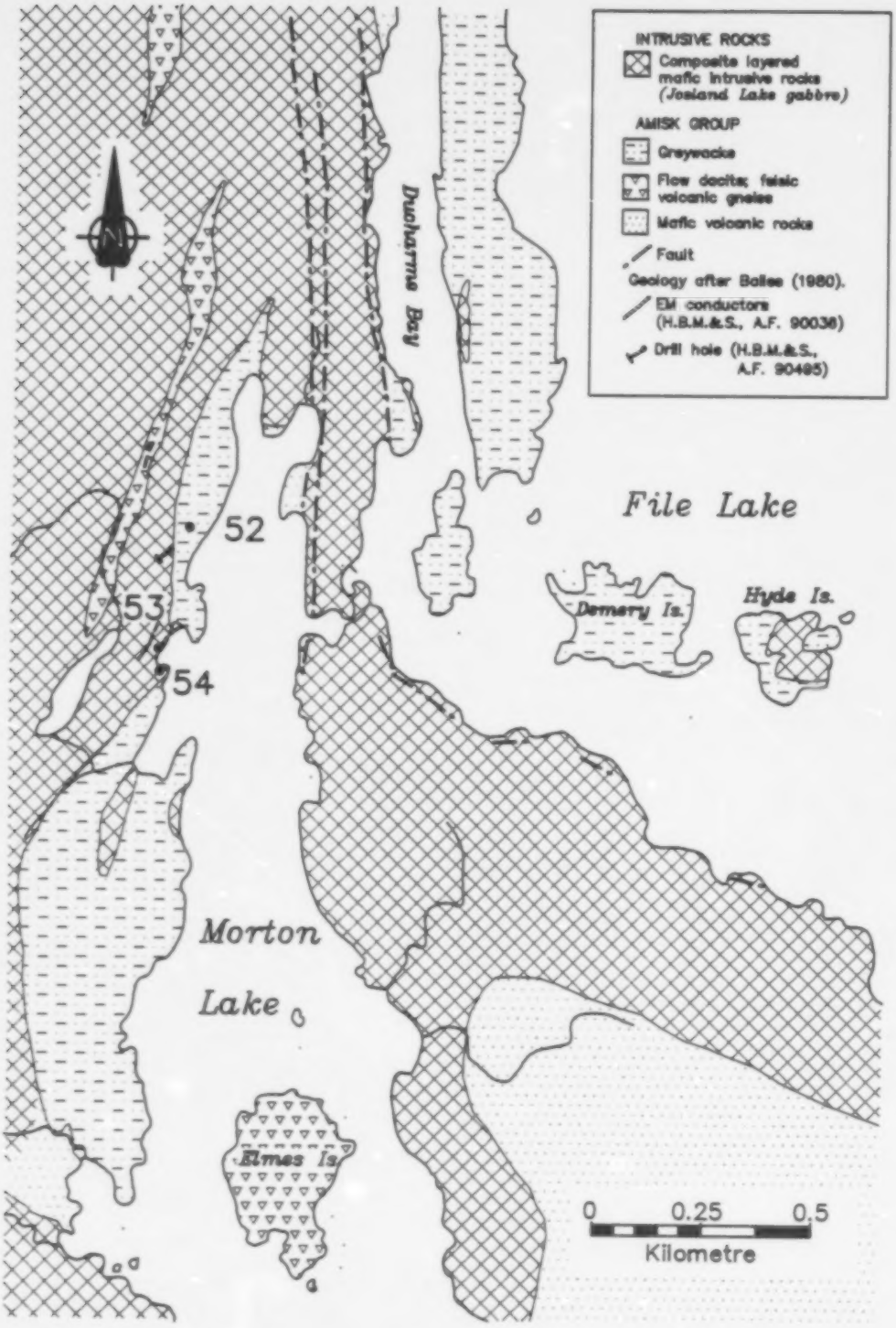



*Figure 52-1: Geological setting of occurrences 52, 53 and 54*

**LOCATION:** 52

**NAME:** WHITE STAR NO. 2
**UTM:** 6080664N/406924E
**ACCESS:** Bush aircraft.

**AREA:** Morton Lake
**AIRPHOTO:** A26368-86

EXPLORATION SUMMARY:

The White Star No. 2 claim (P 1027) was recorded over occurrence 52 (Fig. 52-1) in 1934 by A. Nieme (Stockwell, 1935). The claim was transferred to W. Hiebert the following year. Rock trenching was reported for the next four years, however only one 10 x 1-2 m trench was located (Ostry, 1984). HBM&S completed one diamond drill hole adjacent to the trench in 1952 and in 1956 conducted an EM survey over the area (A.F. 90036). No anomalies were detected in the vicinity of the occurrence. The ground is presently (1988) covered by claim File 4 (W 47570) held by Varna Gold Incorporated. A detailed history of claim staking on the area of occurrence 52 can be found in Mineral Inventory Card 63K/16 Au 20.

GEOLOGICAL SETTING:

The area is underlain by metagreywacke of the File Lake Formation (Stockwell, 1925; Harrison, 1949; Bailes, 1980). The mineralization occurs within 30 m of an intrusive contact of the Josland Lake Gabbro.

MINERALIZATION:

The mineralization is exposed in an approximately 10 m long by 1-2 m wide trench (Fig. 52-2) and consists of up to 2% disseminated pyrite and locally, up to 15% stringer chalcopyrite mobilizate within sheared, altered and, in places, brecciated metagreywacke (Ostry, 1984). Up to 4 mm thick quartz veins (± chalcopyrite) locally crosscut the shear fabric. Alteration includes local silicification and biotite development. Harrison (1949) reported a few specks of arsenopyrite at this occurrence. Although exposure in the area of mineralization is poor and oxidation has effaced the exposure in the trench, the width of the sheared and mineralized zone is envisaged to be on the order of 10 m or less. The diamond drill hole completed by HBM&S in 1952 intersected approximately 3 m of carbonatized rock with up to 5% chalcopyrite, pyrite and/or pyrrhotite.

GEOCHEMICAL DATA:

Stockwell (1935) reported a sample of the mineralized gneiss assayed 24 g/t Au. A sample from the trench (Fig. 52-2) contained 0.4% Cu, 41 ppb Au and 86 ppm As (Appendix I).

CLASSIFICATION:

Disseminated sulphide mineralization - not classified.

REFERENCES:


Assessment File 90036
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping lakes area, Manitoba; Geological Survey of Canada, Memoir 250, 92 p.

Mineral Inventory Card 63K/16 Au 20
Manitoba Energy and Mines, Minerals Division.

Ostry, G.
1984: Mineral occurrence studies in the File Lake area of Manitoba; In Manitoba Mineral Resources Division, Report of Field Activities 1984, p. 53-59.

Stockwell, C.H.
1935: Gold deposits of Elbow-Morton Lake area, Manitoba; Canada Department of Mines, Memoir 186.

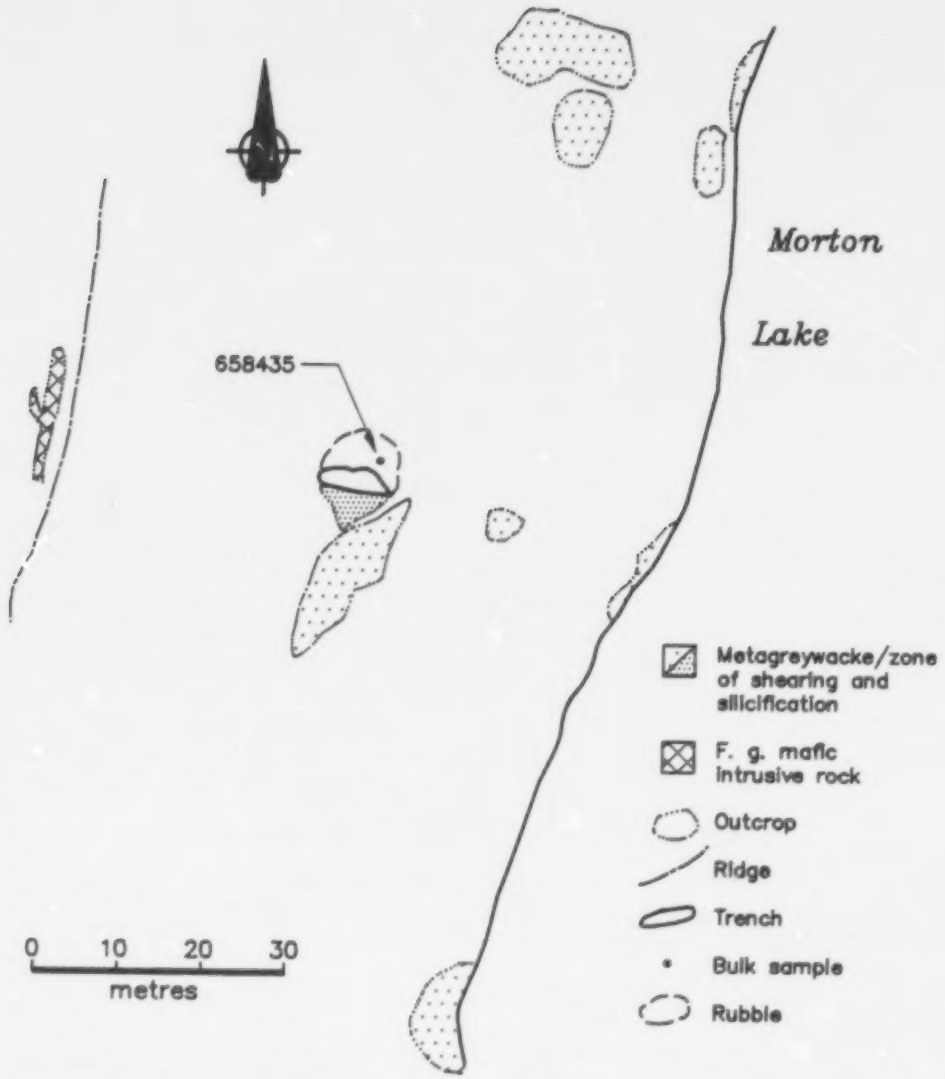



*Figure 52-2: Outcrop distribution, geology, trench and sample locations at occurrence 52*

**LOCATION: 53**

**NAME:**
**UTM: 6080205N/406828E**
**ACCESS: Bush aircraft.**

**AREA: Morton Lake (Fig. 52-1)**
**AIRPHOTO: A26368-86**

EXPLORATION SUMMARY:

HBM&S conducted an EM survey over the area in 1956 (A.F. 90036) and detected two anomalies in the vicinity of the occurrence (Fig. 52-1). One drill hole was completed in the area (Fig 52-1), but the drill log was not submitted for assessment (A.F. 90495). Two trenches were observed at the shoreline (Ostry, 1984). The ground is presently (1988) covered by claim File 4 (W 47570) held by Varna Gold Incorporated.

GEOLOGICAL SETTING:

The mineralization occurs adjacent to or at the contact of the Josland Lake metagabbro with the File Lake Formation metagreywacke (Stockwell, 1925; Harrison, 1949; Bailes, 1980).

MINERALIZATION:

A maximum of 2% pyrrhotite occurs as fine grained blebs and disseminations within sheared and altered metagabbro and metagreywacke (Fig. 53-1). Outcrops in the vicinity of the occurrence exhibit heavy Fe-stain, local biotite development and silicification.

GEOCHEMICAL DATA:

A geochemical analysis of sample 658455 from the mineralized zone (Fig. 53-1) is presented in Appendix I. The sample contained 159 ppm Cu and 375 ppm Pb but no Au or Ag values.

CLASSIFICATION:

Disseminated mineralization - not classified.

REFERENCES:


Assessment Files 90036, 90495
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping lakes area, Manitoba; Geological Survey of Canada, Memoir 250, 92 p.

Ostry, G.
1984: Mineral occurrence studies in the File Lake area of Manitoba; In Manitoba Mineral Resources Division, Report of Field Activities 1984, p. 53-59.

Stockwell, C.H.
1935: Gold deposits of Elbow-Morton Lake area, Manitoba; Canada Department of Mines, Memoir 186.

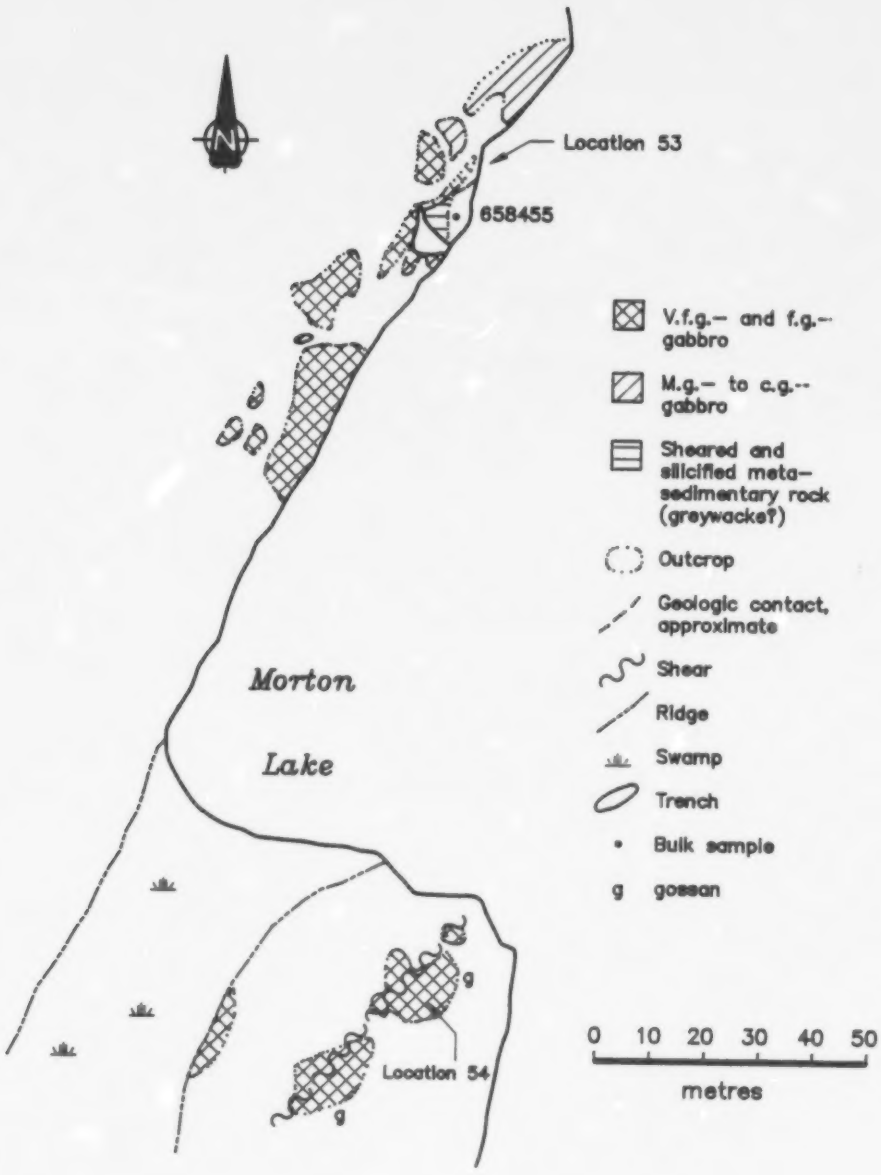



*Figure 53-1: Outcrop distribution, geology, trench and sample locations at occurrence 53*

**LOCATION: 54**

**NAME: WHITE STAR NO. 1**
**UTM: 6080032N/406809E**
**ACCESS: Bush aircraft.**

**AREA: Morton Lake (Fig. 52-1, 53-1)**
**AIRPHOTO: A26368-86**

EXPLORATION SUMMARY:

The White Star No. 1 claim (P 1026) was recorded over occurrence 54 in 1934 by A. Nieme (Stockwell, 1935). HBM&S conducted an EM survey over the area in 1956 (A.F. 90036). Two anomalies were detected in the vicinity of the occurrence (Fig. 52-1). Trenching was not observed at the occurrence (Ostry, 1984). The ground is presently (1988) covered by claim File 4 (W 47570) held by Varna Gold Incorporated. A detailed history of claim staking in the area of occurrence 54 can be found in Mineral Inventory Card 63K/16 Au 15.

GEOLOGICAL SETTING:

The mineralization occurs adjacent to or at the contact of the Josland Lake gabbro and the File Lake Formation metagreywacke (Stockwell, 1925; Harrison, 1949; Bailes, 1980).

MINERALIZATION:

The mineralization is associated with sheared, brecciated and altered metagabbro and metagreywacke (Fig. 53-1). Outcrop in the vicinity of the occurrence exhibit heavy Fe stain and are locally silicified. Mineralization consists of up to 3% disseminated pyrite and parallel to subparallel 1 mm wide pyrite laminae aligned in the direction of foliation.

GEOCHEMICAL DATA:

Stockwell (1935) reported that a sample of the mineralized rock assayed 1.7 g/t Au.

CLASSIFICATION:

Disseminated mineralization - not classified.

REFERENCES:


Assessment File 90036
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping lakes area, Manitoba; Geological Survey of Canada, Memoir 250, 92 p.

Mineral Inventory Card 63K/16 Au 15
Manitoba Energy and Mines, Minerals Division.

Ostry, G.
1984: Mineral occurrence studies in the File Lake area of Manitoba; In Manitoba Mineral Resources Division, Report of Field Activities 1984, p. 53-59.

Stockwell, C.H.
1935: Gold deposits of Elbow-Morton Lake area, Manitoba; Canada Department of Mines, Memoir 186.

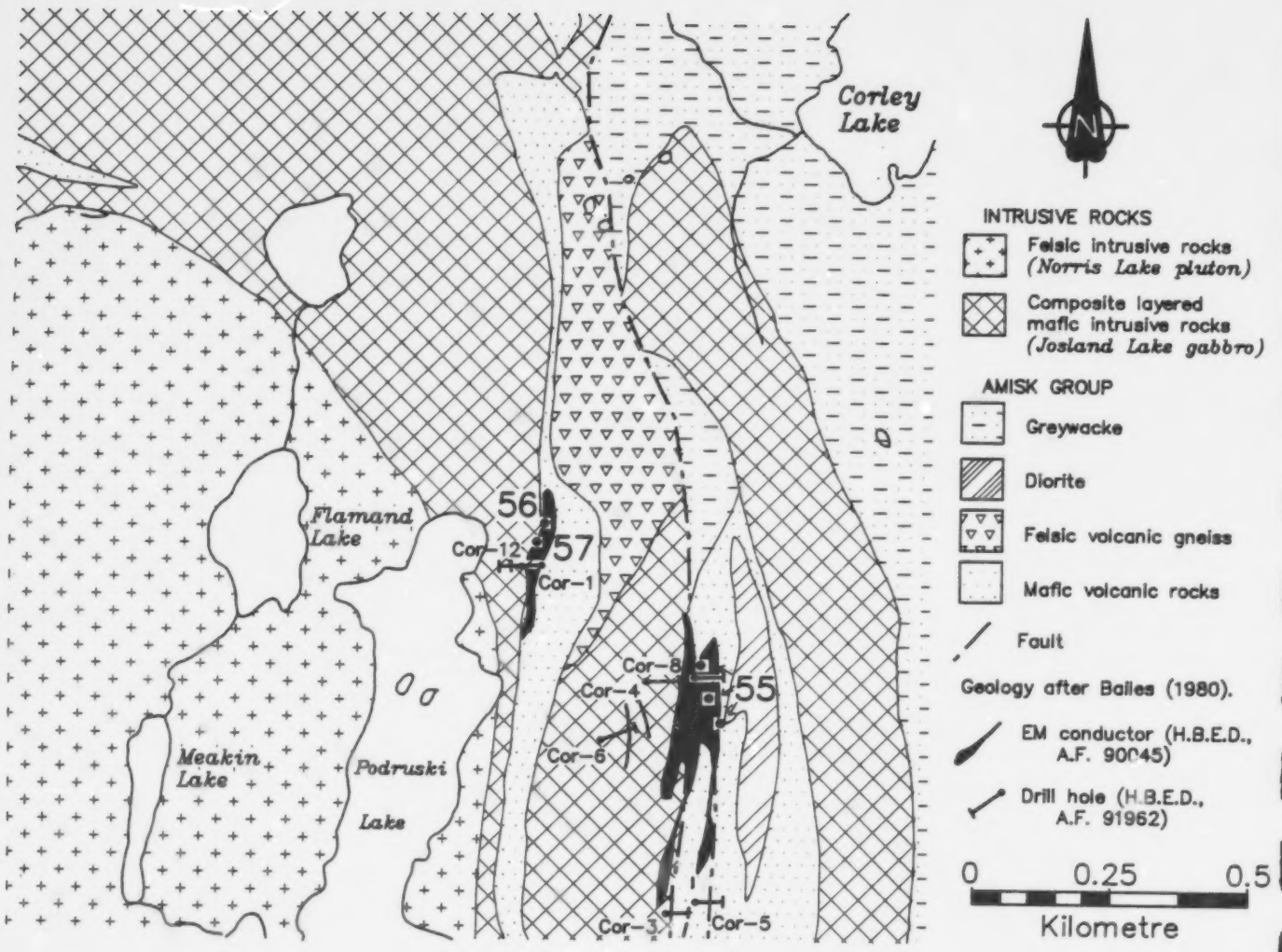



*Figure 55-1: Geological setting of occurrences 55, 56 and 57*

**LOCATION: 55**

**NAME:**
**UTM: 6085293N/407515E**
**ACCESS: Bush aircraft/traverse.**

**AREA: Northwest of File Lake**
**AIRPHOTO: A26367-63**

EXPLORATION SUMMARY:

Harrison (1949) and Bailes (1980) documented trenching and Fe-sulphide mineralization in the vicinity of occurrence 55. In 1956, Madsen Red Lake Mines Limited conducted a ground magnetic survey and a 1" = 200' geological mapping program in the area (A.F. 90046). In 1966 HBED conducted a horizontal loop electromagnetic survey over the area (A.F. 90045) and outlined a number of north-south trending conductors that are coincident with the mineralization at location 55 (Fig. 55-1). These conductors were tested by five DDHs (Fig. 55-1) completed by HBED in 1967 (A.F. 91962). The area is presently (1988) covered by claims File 1 (W47567) and File 2 (W47567) held by Varna Gold Incorporated.

GEOLOGICAL SETTING:

Occurrence 55 occurs along a north-south trending shear zone in an area underlain by mafic volcanic gneiss and rocks of the Josland Lake gabbro (Harrison, 1949; Bailes, 1980).

MINERALIZATION:

Trenches at occurrence 55 (Fig. 55-2) intersect a sequence of strongly foliated mafic volcanic (locally silicified) gneiss, felsic sedimentary (quartz-biotite-garnet) gneiss and sulphide-bearing graphite schist. This sequence of rocks outcrops along north-trending ridges for approximately 1 km from the north end of Ducharme Bay on File Lake (Fig. 55-1).

Pyrrhotite and minor pyrite were the only sulphides observed. The graphite unit(s) contain up to 25% sulphide as disseminations, blebs, thin crosscutting veins and as coarse, recrystallized aggregates associated with quartz augen. The host rocks commonly contain up to 5% disseminated Fe-sulphides.

Diamond drilling by HBED intersected interlayered rhyolite, altered rhyolite, quartz-hornblende-biotite gneiss, gabbro and altered gabbro. All units are variably mineralized with disseminated to near solid pyrrhotite ± pyrite sections that may contain up to 50% graphite. Both the conductor(s) and graphite unit(s) terminate approximately 1 km north of Ducharme Bay, notwithstanding the continuation of the shear, suggesting a formational mineralized zone (Bailes, 1980). Varna Gold Inc. reports mineralization of up to 24.7 g/t Au on its File and Loon claims (company report to stockholders, 1988).

GEOCHEMICAL DATA:

Four bulk samples were collected for geochemical analysis (Appendix I), three from trenched mineralization (658478, 658483 and 658485) and one (658484) from an Fe-stained outcrop of quartz-biotite-garnet gneiss (Fig. 55-2). Sample 658478 contained 739 ppm As and 22 ppb Au. Sample 658482 contains 16 ppb Au.

CLASSIFICATION:

Chemical sediment-type deposit. Graphitic iron sulphide formation.

REFERENCES:


Assessment Files 90045, 90046, 91962
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping lakes area, Manitoba; Geological Survey of Canada, Memoir 250, 92 p.

Ostry, G.
1984: Mineral occurrence studies in the File Lake area of Manitoba; In Manitoba Mineral Resources Division, Report of Field Activities 1984, p. 53-59.

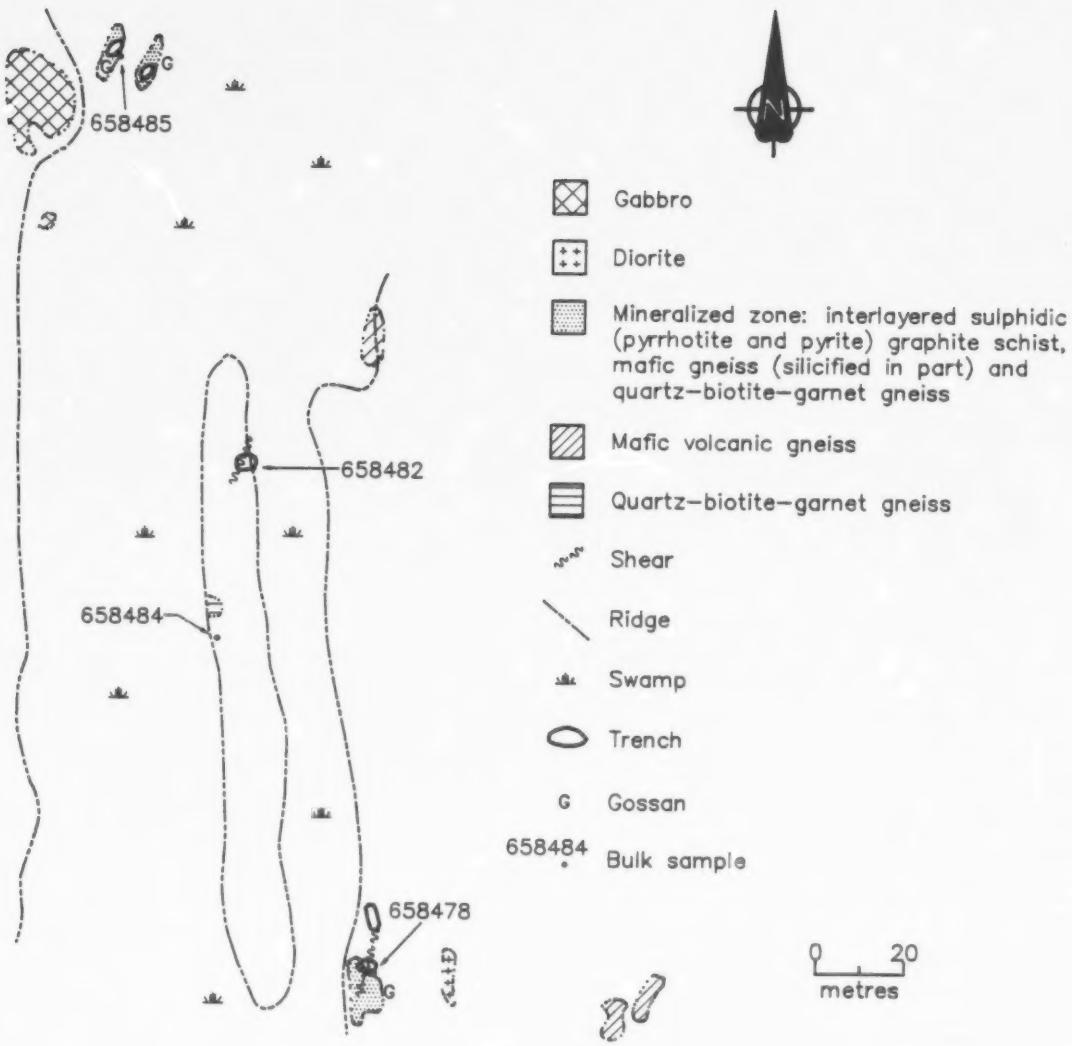



*Figure 55-2: Outcrop distribution, geology, trench and sample locations at occurrence 55*

**LOCATION: 56**

**NAME:**
**UTM: 6085928N/406918E**
**ACCESS: Bush aircraft.**

**AREA: Podruski Lake (Fig. 55-1)**
**AIRPHOTO: A26368-82**

EXPLORATION SUMMARY:

In 1965 and 1966 HBM&S outlined a 550 m long horizontal loop conductor (A.F. 90045) east of Podruski Lake that is coincident with occurrences 56 and 57 and parallel to the trend of stratigraphy. HBM&S drilled two holes (A.F. 91962) in the vicinity of the conductor (Fig. 55-1), but drill logs were not included with the assessment report. One trench was located at occurrence 56 (Fig. 56-1). Both occurrences 56 and 57 occur near the western boundary of claim File 1 (W47567) presently (1988) held by Varna Gold Incorporated.

GEOLOGICAL SETTING:

The area is underlain by mafic volcanic gneiss (Stockwell, 1935; Harrison, 1949; Bailes, 1980; Ostry, 1984).

MINERALIZATION:

The mineralization consists of interlayered solid to near solid Fe-sulphide layers and fine grained to very fine grained felsic to mafic tuffaceous/chemical sedimentary gneiss and a quartz-biotite-feldspar-garnet gneiss (greywacke).

Pyrrhotite is the dominant sulphide and is commonly accompanied by coarse grained pyrite that is lensoid in places. Minor chalcopyrite constitutes up to 1% of the unit and occurs as distinct grains and/or fracture-controlled mobilizate. The sulphide-rich unit(s) also contains a very fine grained quartz-biotite-chlorite assemblage that forms thin continuous bands (less than 1 cm) suggestive of primary layering.

The mineralization is envisaged to be on the order of metres to possibly tens of metres in thickness. Visible alteration in and around these sulphide zones is rare, except for minor local silicification that is attributed to late shearing.

GEOCHEMICAL DATA:

A grab sample of solid to near solid pyrrhotite (Fig. 56-1) contained 0.05% Cu, 0.01% Zn and 14 ppb Au (Appendix I).

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation.

REFERENCES:


Assessment File 90045, 91962
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping lakes area, Manitoba; Geological Survey of Canada, Memoir 250, 92 p.

Ostry, G.
1984: Mineral occurrence studies in the File Lake area of Manitoba; In Manitoba Mineral Resources Division, Report of Field Activities 1984, p. 53-59.

Stockwell, C.H.
1935: Gold deposits of Elbow-Morton Lake area, Manitoba; Canada Department of Mines, Memoir 186.

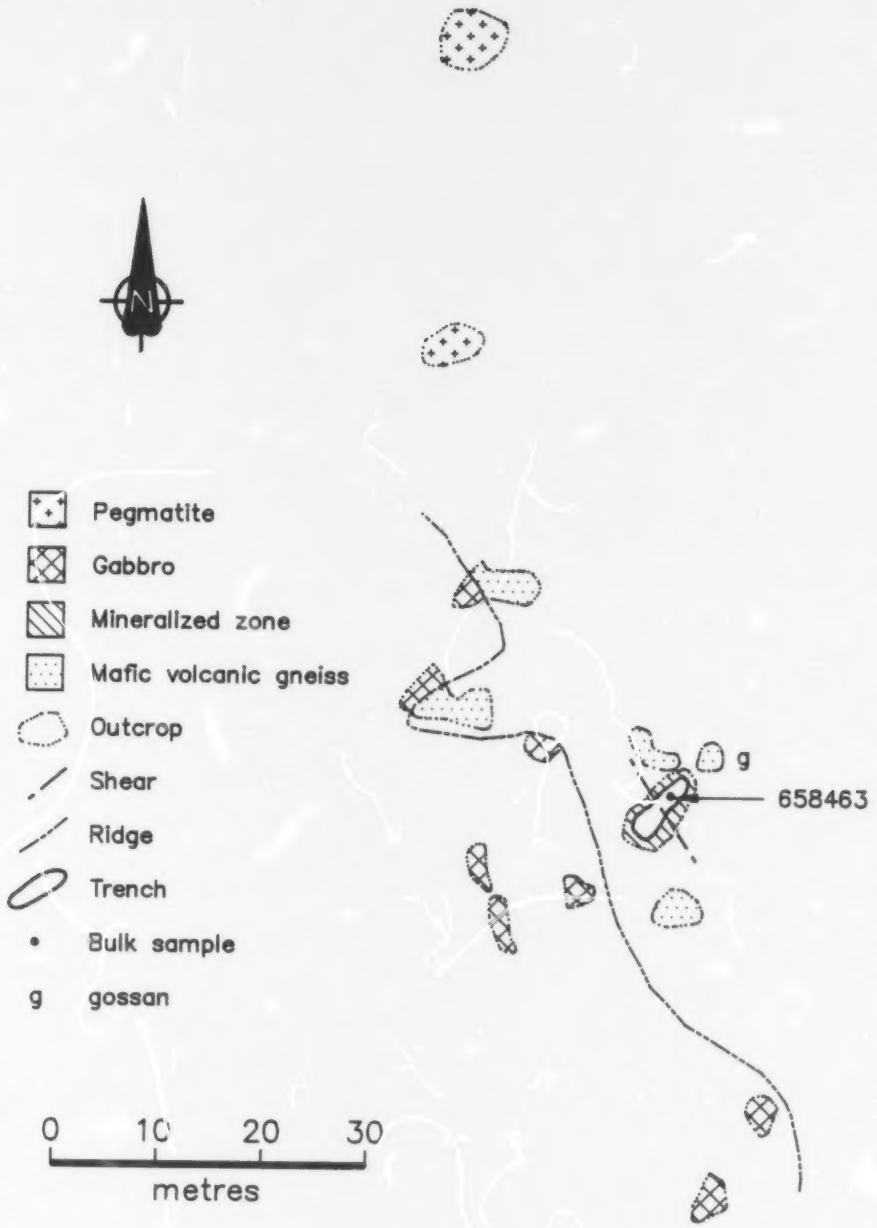



*Figure 56-1: Outcrop distribution, geology, trench and sample location at occurrence 56*

**LOCATION:** 57

**NAME:**
**UTM:** 6085846N/406897E
**ACCESS:** Bush aircraft.

**AREA:** Podruski Lake (Fig. 55-1)
**AIRPHOTO:** A26368-82

EXPLORATION SUMMARY:

In 1965 and 1966 HBM&S outlined a 550 m long horizontal loop conductor (A.F. 90045) east of Podruski Lake that is coincident with occurrences 56 and 57 and parallel to the trend of stratigraphy. HBM&S drilled two holes (A.F. 91962) in the vicinity of the conductor (Fig. 55-1), however, drill logs were not included with the assessment report. Two trenches were located at occurrence 57 (Fig. 57-1). Occurrences 56 and 57 occur near the western boundary of claim File 1 (W47567) presently (1988) held by Varna Gold Incorporated.

GEOLOGICAL SETTING:

The area is underlain by mafic volcanic gneiss (Stockwell, 1935; Harrison, 1949; Bailes, 1980; Ostry, 1984).

MINERALIZATION:

The south trench (Fig. 57-1) exposes interlayered felsic to mafic tuffaceous/sedimentary gneiss that contains up to 20% disseminated fine grained pyrrhotite, a rare speck of chalcopyrite and late crosscutting pyrite-pyrrhotite veins up to 1 mm. Fine grained mafic gneiss with up to 1% disseminated pyrrhotite is exposed in the north trench (Fig. 57).

GEOCHEMICAL DATA:

A grab sample from the south trench (Fig. 57-1) contained 0.05% Cu and 8 ppb Au (Appendix I).

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation.

REFERENCES:


Assessment File 90045, 91982
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping lakes area, Manitoba; Geological Survey of Canada, Memoir 250, 92 p.

Ostry, G.
1984: Mineral occurrence studies in the File Lake area of Manitoba; In Manitoba Mineral Resources Division, Report of Field Activities 1984, p. 53-59.

Stockwell, C.H.
1935: Gold deposits of Elbow-Morton Lake area, Manitoba; Canada Department of Mines, Memoir 186.

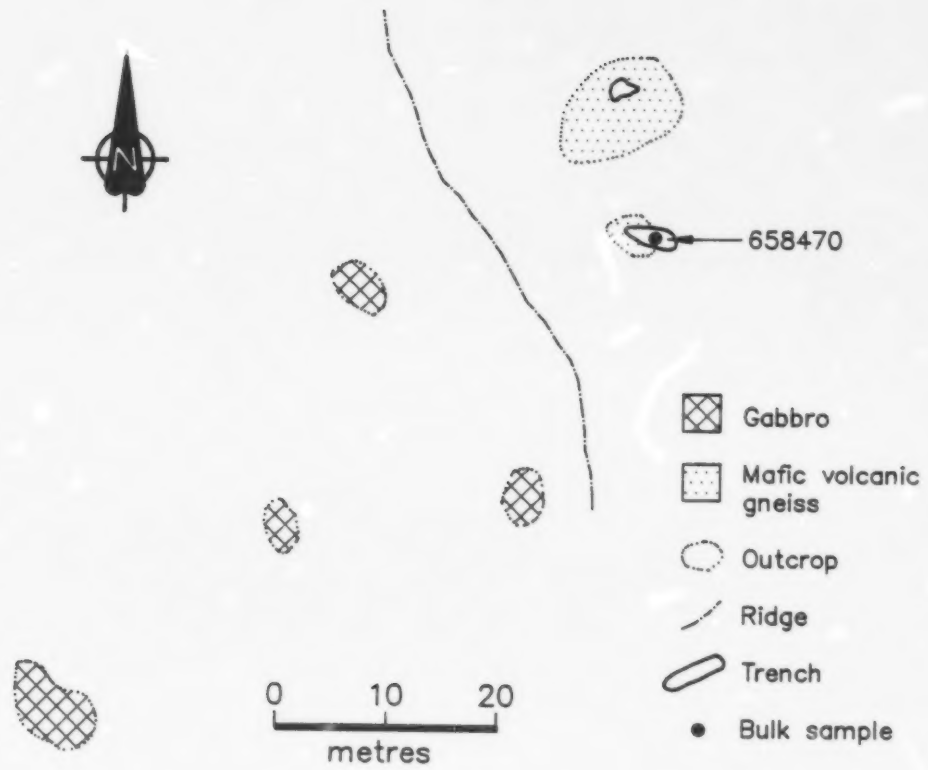



*Figure 57-1: Outcrop distribution, geology, trench and sample location at occurrence 57*

**LOCATION: 58**

**NAME: DICKSTONE Cu-Zn DEPOSIT**
**UTM: 6079323N/404028E**
**ACCESS: Bush aircraft.**

**AREA: Storozuk Lake**
**AIRPHOTO: A26367-167**

EXPLORATION SUMMARY:

In 1936 and 1937 diamond drilling and surface work by Sherritt Gordon Mines Limited delineated a stratiform Cu-bearing massive sulphide deposit (Fig. 58-1,2) containing approximately 200 000 tonnes (the No. 1 orebody). In 1937 all interests in the property passed to Dickstone Copper Mines Limited. The property was optioned to HBM&S in 1965. HBM&S, after 3050 m of diamond drilling, increased the reserves of the No. 1 orebody and located the Zn-Cu bearing No. 2 orebody approximately 600 m NNE of the No. 1 orebody (Fig. 58-2; Mineral Inventory Card 63K/16 Cu2).

A shaft collared at the No. 1 orebody in 1964 was completed in 1969. A second shaft, at the No. 2 orebody, was completed the same year. Production commenced on November 2, 1970 at a rate of 600 tonnes per day. The mining operation ceased in August, 1975. During the operation of the mine approximately 775 210 tonnes of ore were mined. Interest in the property reverted back to Dickstone Copper Mines Ltd. in July, 1983.

GEOLOGICAL SETTING:

Both orebodies are hosted by felsic fragmental metavolcanic rocks of the Dickstone Formation (Harrison, 1949; Bailes, 1980). Felsic fragmental metavolcanic rocks are common at two localities within the Dickstone Formation: 1) hosting and in proximity to the massive sulphide deposits in the mine area; and, 2) approximately 4 km SSW along strike from Storozuk Lake (Fig. 58-3). The Dickstone Formation is overlain by pillowed mafic metavolcanic rocks to the east and underlain to the west by mafic to intermediate metavolcanic flow rocks (Fig. 58-3).

MINERALIZATION:

Detailed accounts of the mineralization are presented by Morrice (1974) and Bailes (1980). The No. 1 orebody is a lens-shaped Cu-Zn massive sulphide deposit hosted by felsic fragmental metavolcanic rocks near the stratigraphic base of the Dickstone Formation. The deposit plunges steeply to the south, has a strike length of 235 m, averages 3 m in width (at surface), is 105 m deep and open at depth (Harrison, 1949). The sulphide minerals of the No. 1 orebody have been coarsely recrystallized and comprise a granoblastic mosaic of pyrrhotite, pyrite, chalcopyrite and rare sphalerite. Layering within the sulphide body is rare. The sulphide lens is stratigraphically underlain by a crosscutting Mg-Fe alteration pipe (see Geochemical Data) that includes a limited chalcopyrite stringer zone immediately below the orebody (Fig. 58-2). Common minerals within the alteration zone include anthophyllite, chlorite, staurolite, almandine and cummingtonite. The No. 2 orebody is stratiform, dips close to vertical and plunges steeply to the south. It occurs at the stratigraphic top of the Dickstone Formation in contact with overlying pillowed mafic metavolcanic rocks (Morrice, 1974). The orebody is 0.3-3.0 m wide, approximately 180 m in length and 350 m in depth (Bailes, 1980). The ore is primarily a granoblastic intergrowth of pyrite, sphalerite, chalcopyrite and pyrrhotite (Morrice, 1974). Accessory minerals include

**Table 58-1: Whole rock chemical analyses of altered rocks underlying Dickstone No. 1 orebody (Bailes, 1980).**

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| $SiO_2$ | 74.3 | 68.95 | 66.8 | 60.75 | 30.2 |
| $Al_2O_3$ | 10.7 | 13.3 | 12.6 | 13.65 | 18.6 |
| $Fe_2O_3$ | 1.46 | 1.09 | 2.19 | 2.71 | 6.85 |
| FeO | 3.78 | 4.23 | 11.10 | 7.81 | 17.87 |
| MgO | 1.92 | 1.23 | 1.85 | 1.95 | 14.65 |
| CaO | 1.09 | 4.09 | 0.60 | 7.20 | 1.10 |
| $Na_2O$ | 3.00 | 4.85 | 0.12 | 3.15 | 0.94 |
| $K_2O$ | 0.92 | 0.12 | 1.80 | 0.15 | NIL |
| $TiO_2$ | 0.28 | 0.86 | 0.84 | 1.14 | 1.52 |
| $P_2O_5$ | 0.05 | 0.34 | 0.31 | 0.37 | 0.35 |
| MnO | 0.25 | 0.13 | 0.06 | 0.25 | 0.27 |
| $H_2O\pm$ | 1.39 | 0.61 | 1.19 | 1.00 | 7.69 |
| $CO_2$ | 0.26 | 0.42 | NIL | 0.15 | NIL |
| S | 0.57 | 0.01 | 0.03 | 0.07 | 0.34 |
| Less S=O | | | | (0.03) | (0.14) |
| Cu (ppm) | | NIL | NIL | NIL | 160 |
| Zn (ppm) | | 120 | 120 | 120 | 803 |
| TOTAL | 100.0 | 100.2 | 99.5 | 100.33 | 100.3 |
| Total Fe as $Fe_2O_3$ | 5.61 | 5.74 | 14.40 | 11.30 | 26.5 |

1. Unaltered quartz- and plagioclase-porphyritic sodic metarhyolite, average of three analyses.
2. Tremolite-rich hornblende-bearing slightly altered quartz- and plagioclase-porphyritic metarhyolite from 46 m stratigraphically below Dickstone No. 1 orebody.
3. Zoisite-, biotite- and garnet-rich altered rock from 30 m stratigraphically below Dickstone No. 1 orebody.
4. Epidote- and hornblende-rich altered rock from 30 m stratigraphically below Dickstone No. 1 orebody.
5. Chlorite schist with local porphyroblasts of anthophyllite and staurolite from altered stratigraphic footwall of Dickstone No. 1 orebody.

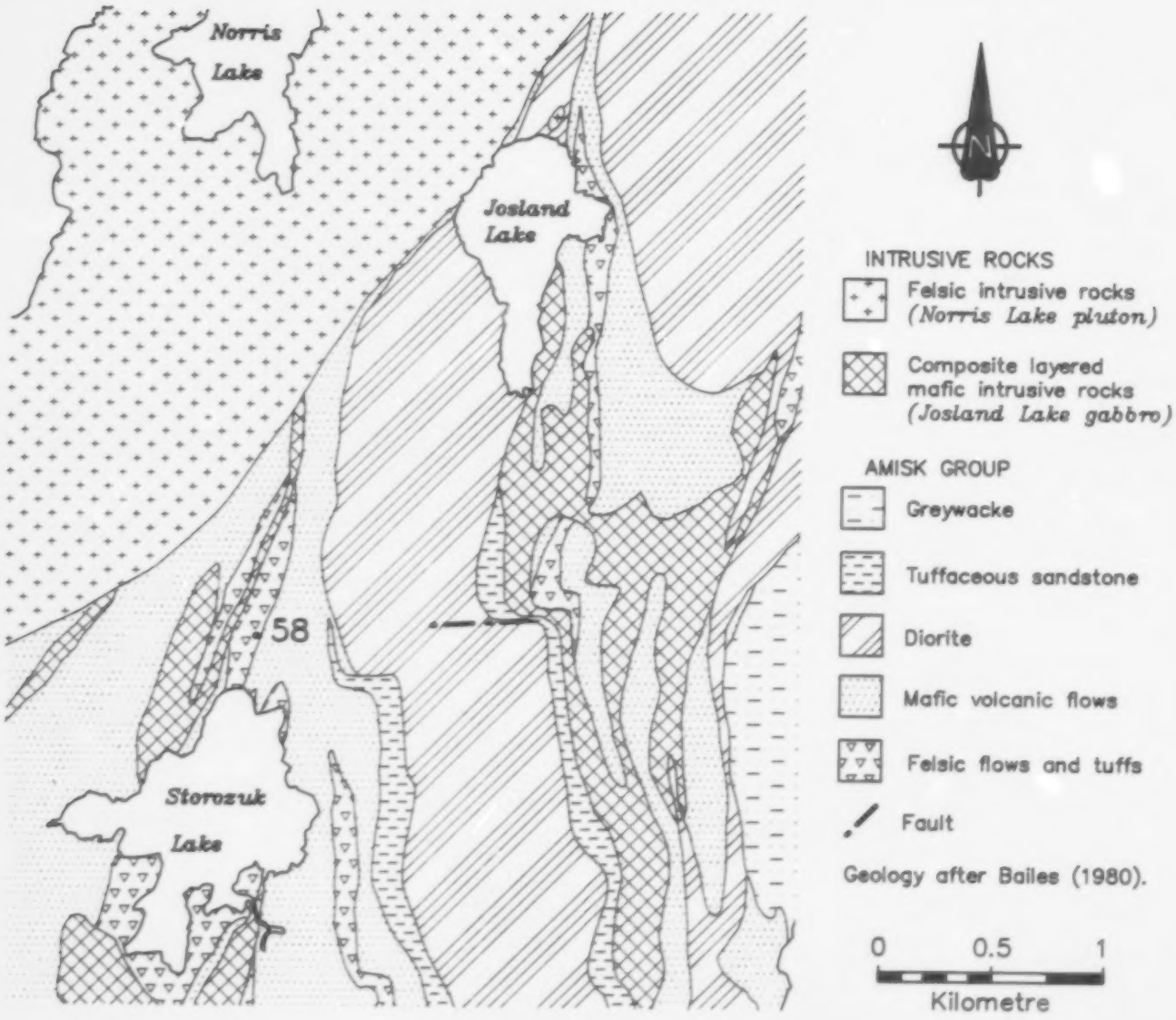



*Figure 58-1: Geological setting of occurrence 58*

quartz and arsenopyrite with minor calcite, scapolite, anhydrite and cassiterite. Local banded textures within the sulphide body are interpreted to have been formed as a result of plastic deformation of the sulphides during post-depositional tectonism (Morrice, 1974). Visible footwall or hanging wall alteration associated with the No. 2 orebody was not identified (Morrice, 1974).

GEOCHEMICAL DATA:

Combined average grade from both orebodies was 2.4% Cu, 3.12% Zn, 12.469 g/t Ag and 0.582 g/t Au (Bailes, 1980). Whole rock geochemical analyses of footwall rocks to the No. 1 orebody are listed, from least to most altered, in Table 58-1. Average grade of the No. 2 orebody as of January, 1972 was 2.04% Cu and 7.9% Zn (Morrice, 1974). In addition Morrice (1974) determined that the orebody contains 0.8% tin (Sn). Cranstone et al. (1978) record that as of January, 1977, 304 450 tonnes of ore with an average grade of 2.43% Cu, 4.5% Zn, 10.63 g/t Ag and 0.41 g/t Au remain as measured and indicated reserves at the Dickstone deposit.

CLASSIFICATION:

Massive sulphide-type Cu-Zn deposit.

REFERENCES


Bailes, A.H.

1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

Cranstone, D.A., McIntosh, J.A. and Azis, A.

1978: Canadian reserves of copper, nickel, lead, zinc, molybdenum, silver and gold as of Jan. 1, 1977; Energy, Mines and Resources Canada, Mineral Bulletin MR 178, 25 p.

Harrison, J.M.

1949: Geology and mineral deposits of File-Tramping lakes area, Manitoba; Geological Survey of Canada, Memoir 250, 92 p.

Manitoba Energy and Mines

Mineral Inventory Card 63K/16 Cu2.

Morrice, M.G.

1974: The occurrence of tin at the Dickstone No.2 orebody, northern Manitoba; M.Sc. thesis (unpublished), University of Manitoba.

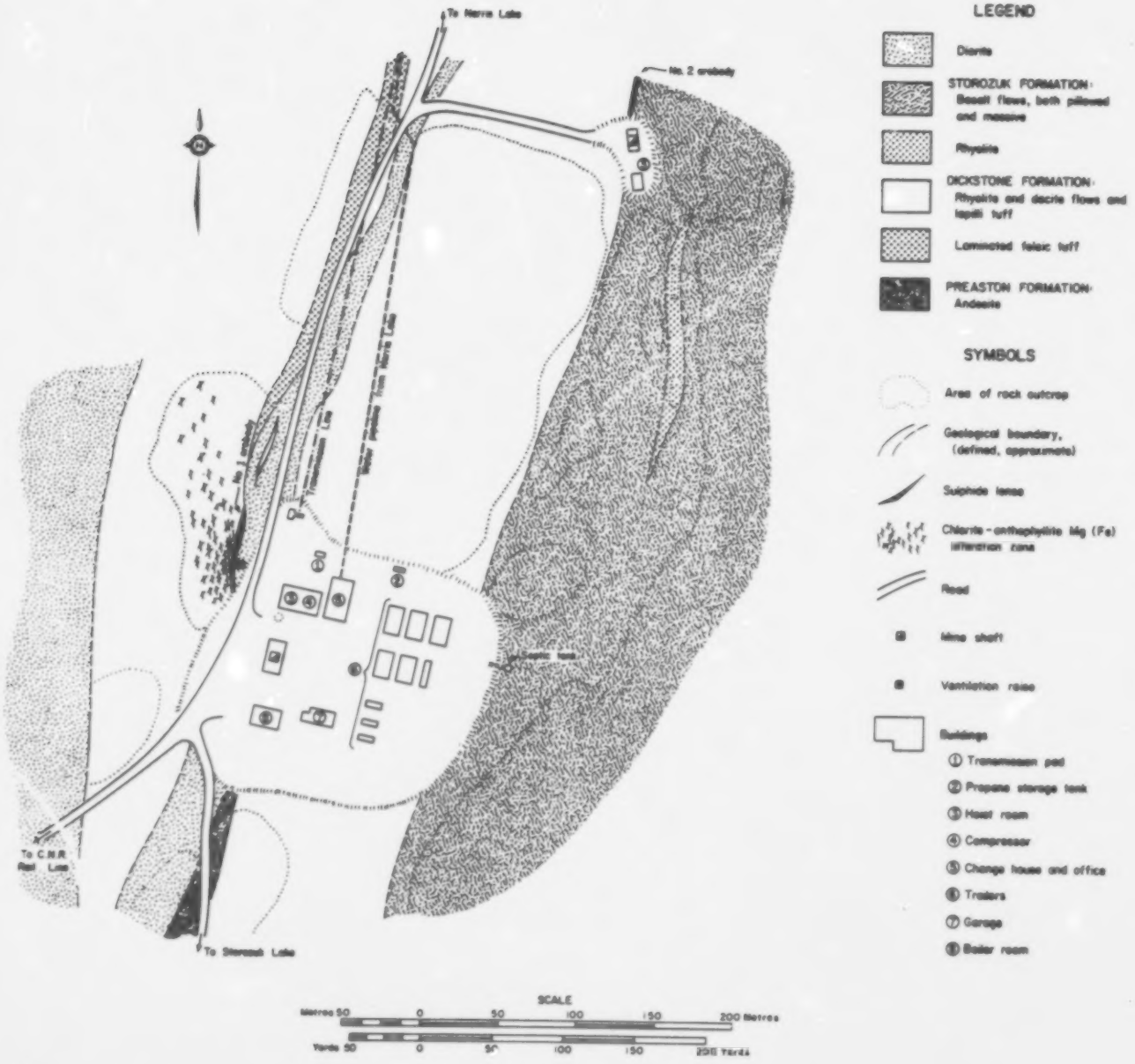



*Figure 58-2: Geology in the vicinity of the Dickstone deposit (after Bailes, 1980)*

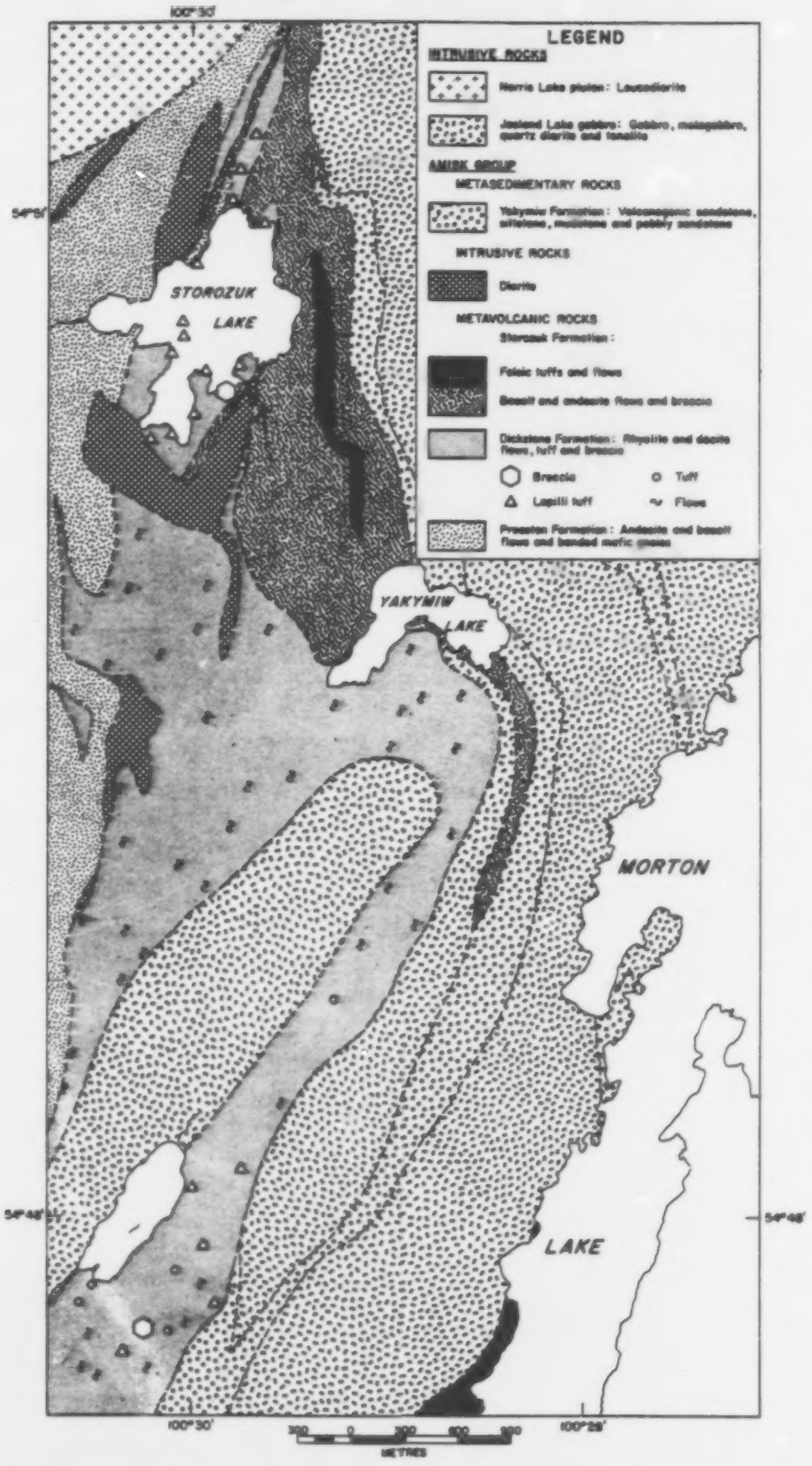



*Figure 58-3: Distribution of flow and fragmental rocks in the Dickstone Formation (after Bailes, 1980)*

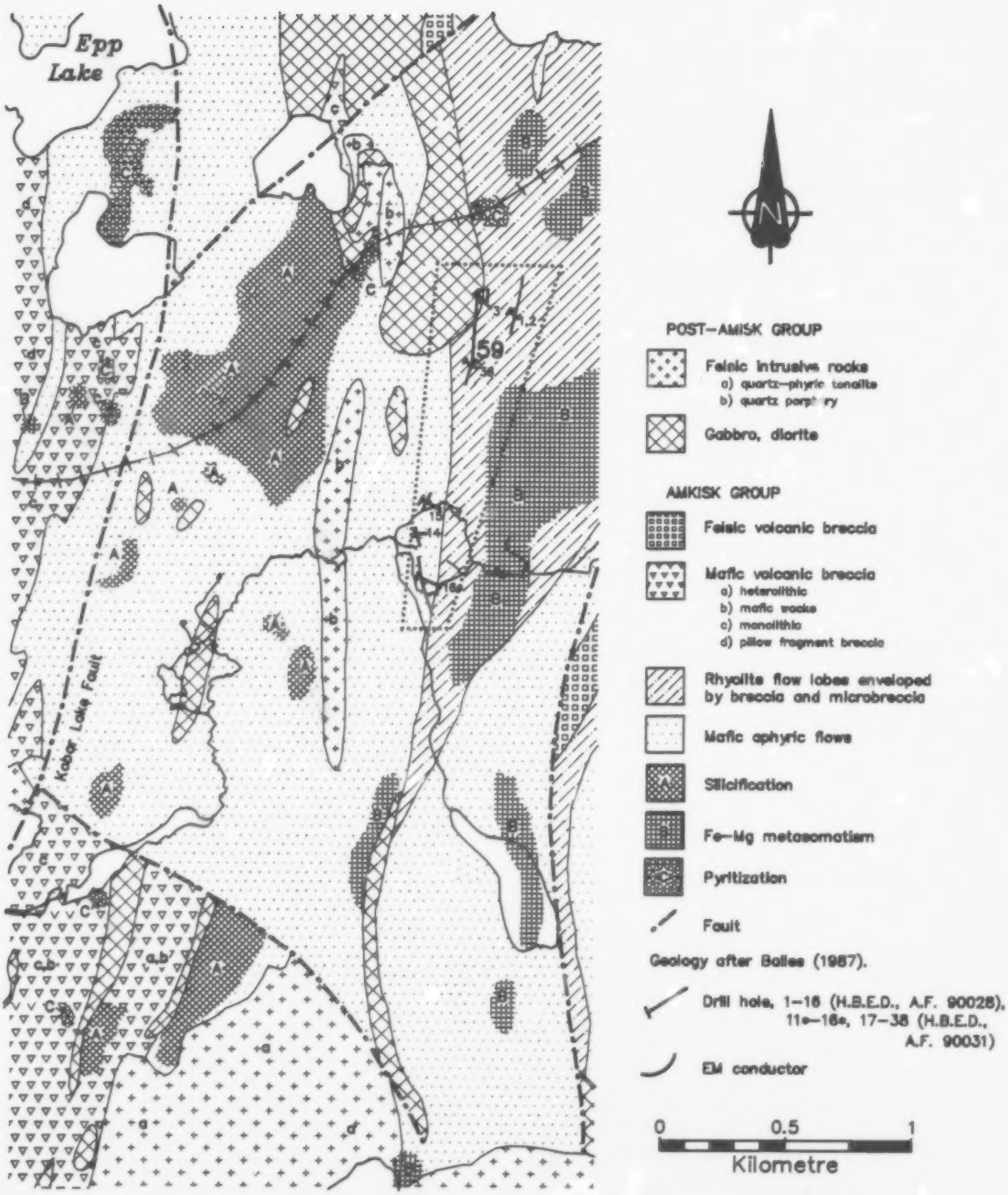



*Figure 59-1: Geological setting of occurrence 59*

**LOCATION: 59**

**NAME: Mineralization intersected by diamond drilling**
**UTM: 6071771N/424358E**
**ACCESS: Drill roads.**

**AREA: 3.75 km east of Woosey Lake**
**AIRPHOTO: A26366-157**

EXPLORATION SUMMARY:

HBED drilled a total of six holes (592 m) to test EM conductors on the Pen claims in 1955 and 1963-64 (A.F. 90028, 90031).

GEOLOGICAL SETTING:

The general area of occurrence 59 is characterized by Amisk Group quartz-phyric rhyolite, breccia and microbreccia and mafic aphyric flows (Fig. 59-1). Hornblende gabbro/diorite dykes with quartz stringers were also noted in drill logs. Descriptions of the host rock to the mineralization vary from foliated quartzite to highly siliceous, partly garnetiferous, mica hornblende gneiss or schist (possibly altered rhyolite). Silicification, minor quartz stringers, tourmaline and garnet are present.

MINERALIZATION:

Disseminated to near solid pyrrhotite, pyrite and lesser chalcopyrite, sphalerite and graphite were intersected in drill core. DDH 36 intersected several near solid pyrrhotite-pyrite sections about 2 m in core length. Minor disseminated pyrite and pyrrhotite within a siliceous sericite schist were intersected over a 43.5 m core length following 10 m of barren quartz in DDH 15.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation. Sulphide mineralization associated with altered felsic volcanic rocks.

REFERENCES:

Assessment Files 90028, 90031
Manitoba Energy and Mines, Minerals Division.

Bailes, A. H.
1987: Chisel-Morgan lakes; Manitoba Energy and Mines, Preliminary Map 1987S-1, 1:15 840.

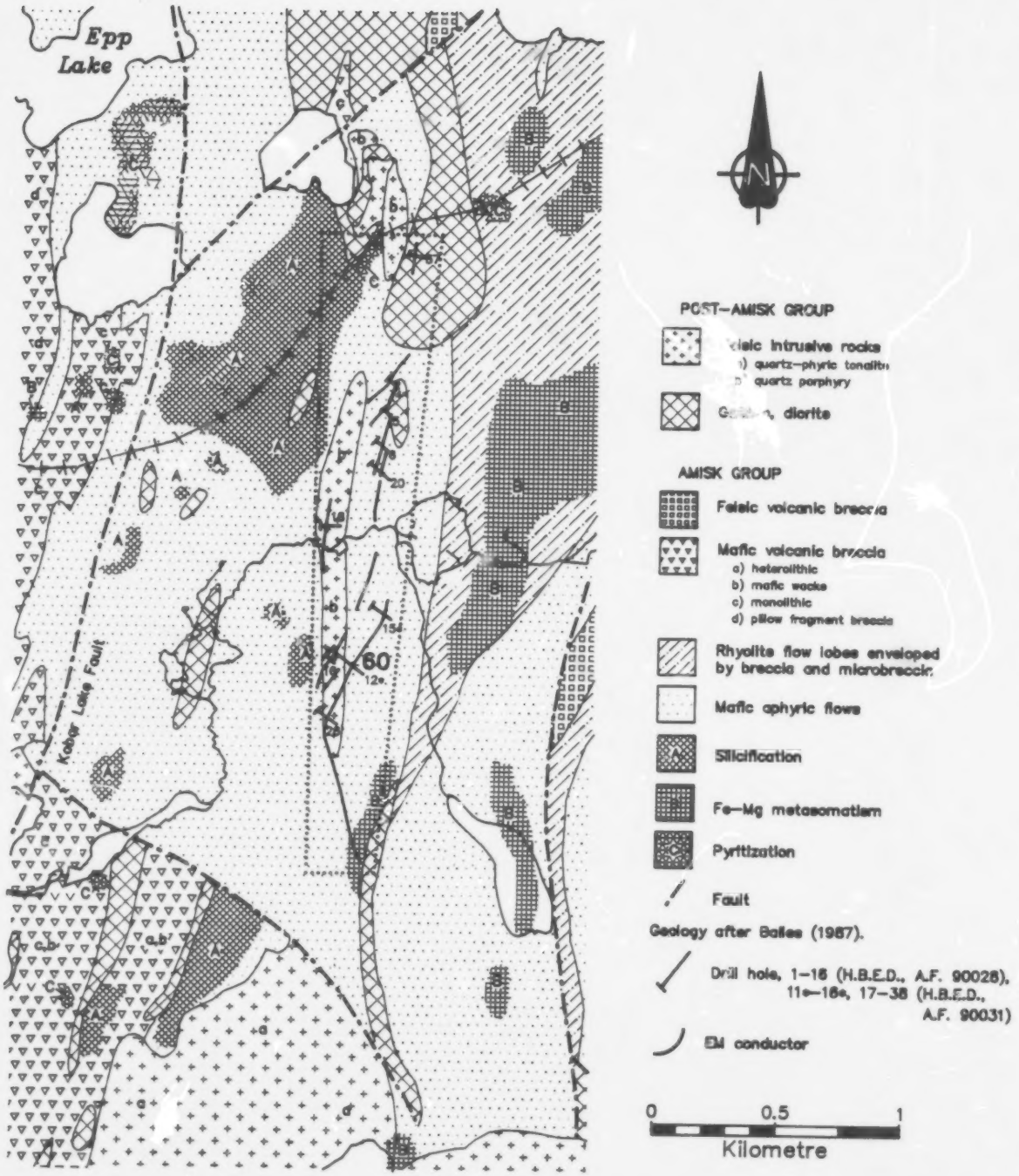



*Figure 60-1: Geological setting of occurrence 60*

**LOCATION:** 60

**NAME:** Mineralization intersected by diamond drilling
**UTM:** 6070295N/423814E
**ACCESS:** Drill roads.

**AREA:** 3 km east of Woosey Lake
**AIRPHOTO:** A26366-158

EXPLORATION SUMMARY:

HBED drilled 10 holes totalling 1310 m to test EM conductors on the Pot and Pen claims in 1955 and 1964 (A.F. 90028, 90031).

GEOLOGICAL SETTING:

The general area of occurrence 60 is underlain by mafic aphyric flows (Amisk Group), quartz-plagioclase porphyry and diorite dykes (Fig. 60-1). Drill logs indicate that this occurrence is hosted by a garnetiferous quartzite/diorite. These rocks may be highly silicified, felsic to intermediate volcanic or sedimentary rocks. Garnet, chlorite and tourmaline are present locally. DDHs 4, 5 and 6 have a predominance of silicified hornblende gabbro/diorite accompanied by quartz stringers and/or garnets; the rock becomes more micaceous and schistose near mineralized areas.

MINERALIZATION:

Minor disseminations of pyrrhotite and pyrite occur throughout most of the drill core. In addition, bands of 40-70% pyrrhotite and pyrite are common in several sections up to 3 m in core length. Rare to minor chalcopyrite is present. In DDHs 4, 5, and 6 the mineralization is confined to a zone 2-8 m in core length that contains disseminated pyrite and pyrrhotite with rare to minor chalcopyrite and sphalerite.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation. Disseminated to near solid sulphide mineralization associated with quartzite. The quartzite may represent silicified felsic to intermediate volcanic rocks.

REFERENCES:

Assessment Files 90028, 90031
Manitoba Energy and Mines, Minerals Division.

Bailes, A. H.
1987: Chisel-Morgan lakes; Manitoba Energy and Mines, Preliminary Map 1987S-1, Scale 1:15 840.

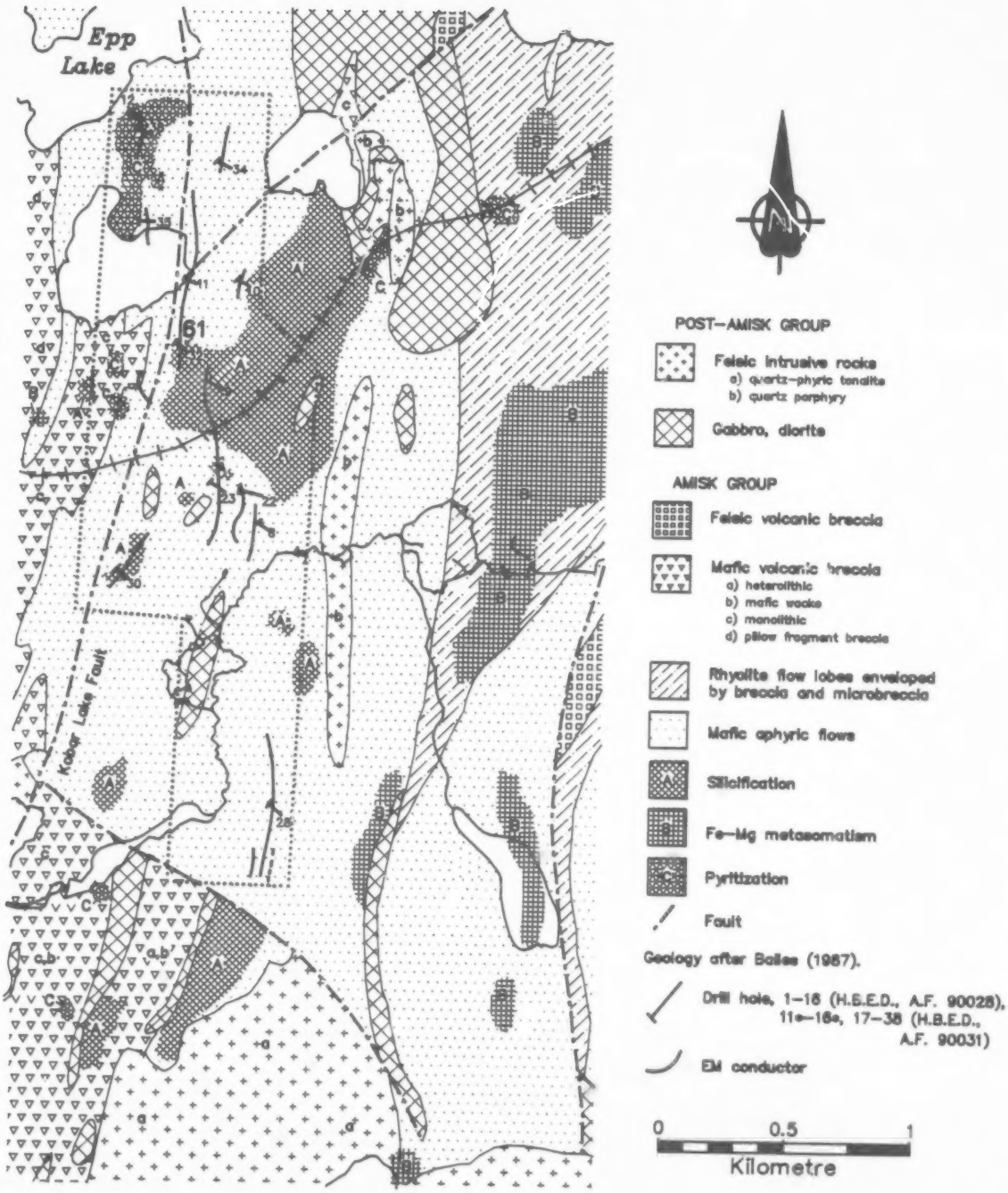



*Figure 61-1: Geological setting of occurrence 61*

**LOCATION: 61**

**NAME: Mineralization intersected by diamond drilling**
**UTM: 6071683N/423054E**
**ACCESS: Drill roads.**

**AREA: 2 km east of northern Morgan Lake**
**AIRPHOTO: A26366-157, A26366-159**

EXPLORATION SUMMARY:

HBED drilled 14 holes totalling 1325 m to test EM conductors on the Pot and Pen claims in 1955 and 1963-64 (A.F. 90028, 90031).

GEOLOGICAL SETTING:

The general area of occurrence 61 is underlain by a sequence of Amisk Group aphyric mafic flows with lesser plagioclase- and pyroxene-plagioclase-phyric mafic dykes (Fig. 61-1). Pervasive silicification and minor epidotization is common. Garnet, chlorite and sericite occur locally.

MINERALIZATION:

Minor pyrite and pyrrhotite mineralization is associated with the altered rocks. The near solid sulphide bands are usually less than 1 m in core length and grouped into zones with core lengths ranging from 4 to 7 m.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation. Disseminated to near solid sulphide mineralization associated with altered mafic volcanic rocks.

REFERENCES:

Assessment Files 90028, 90031
Manitoba Energy and Mines, Minerals Division.

Bailes, A. H.
1987: Chisel-Morgan lakes; Manitoba Energy and Mines, Preliminary Map 1987S-1, 1:15 840.

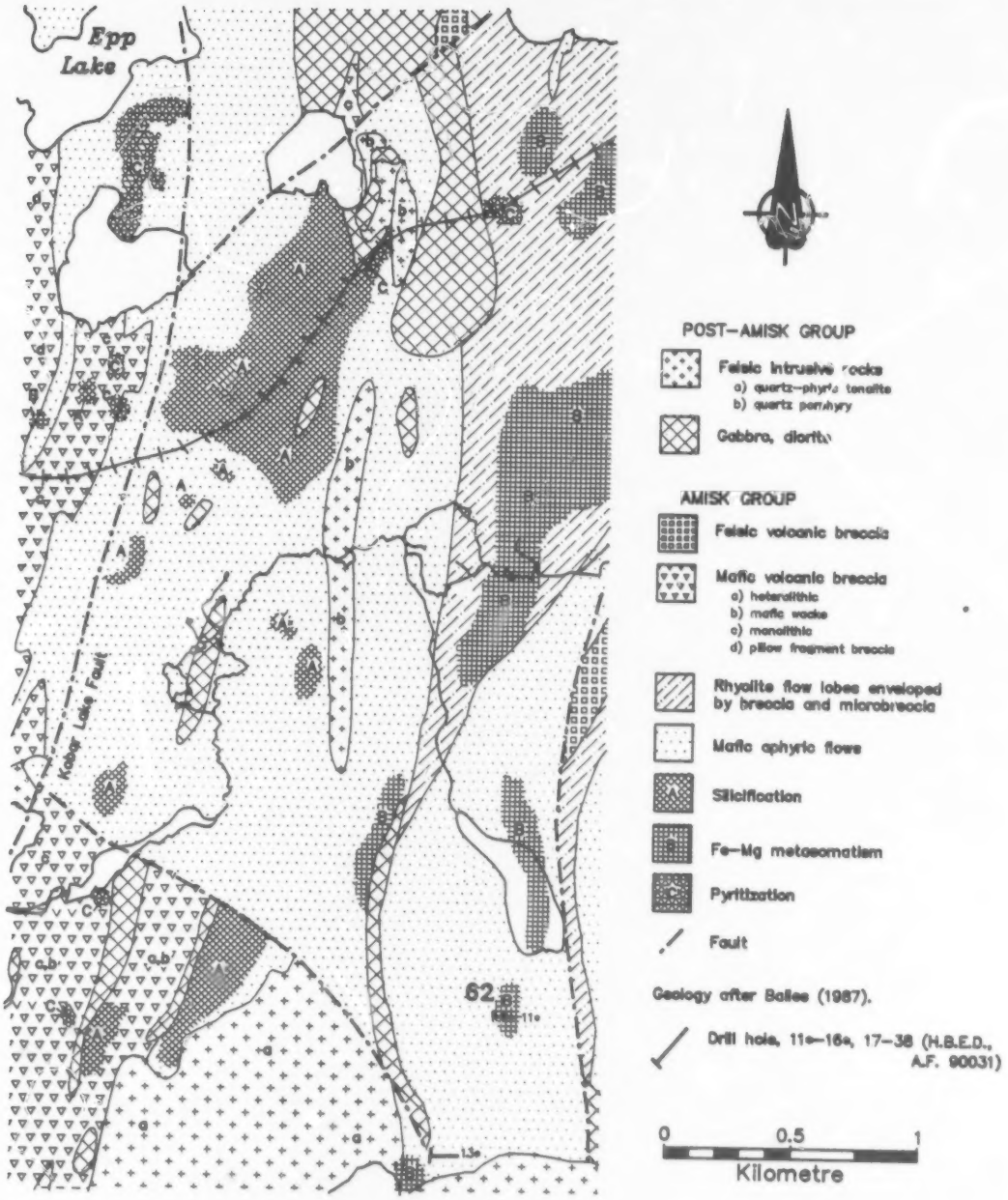



*Figure 62-1: Geological setting of occurrence 62*

**LOCATION: 62**

**NAME: Mineralization intersected by diamond drilling**
**UTM: 6068970N/42424E**
**ACCESS: Drill roads.**

**AREA: 2 km east of Morgan Lake**
**AIRPHOTO: A26366-159**

EXPLORATION SUMMARY:

HBED drilled one hole (DDH 11) to a depth of 123 m on the Pot 9 claim in 1955 (A.F. 90031).

GEOLOGICAL SETTING:

The general area of occurrence 62 is underlain by Amisk Group aphyric mafic flows that locally have undergone intense Fe-Mg metasomatism reflected by the mineral assemblage garnet + chlorite + biotite + amphibole. Drill logs describe mafic volcanic rocks variably altered to chlorite + talc + actinolite ± sericite ± biotite ± garnet schist.

MINERALIZATION:

Minor pyrite and pyrrhotite and rare to minor chalcopyrite are disseminated throughout the schist in a 55 m zone in drill core.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Disseminated mineralization - not classified. Minor sulphide mineralization associated with a chlorite schist assemblage derived from mafic volcanic rocks. Suggestive of alteration associated with massive sulphide-type mineralization.

REFERENCES:

Assessment File 90031;
Manitoba Energy and Mines, Minerals Division.

Bailes, A. H.
1987: Chisel-Morgan lakes; Manitoba Energy and Mines, Preliminary Map 1987S-1, 1:15 840.

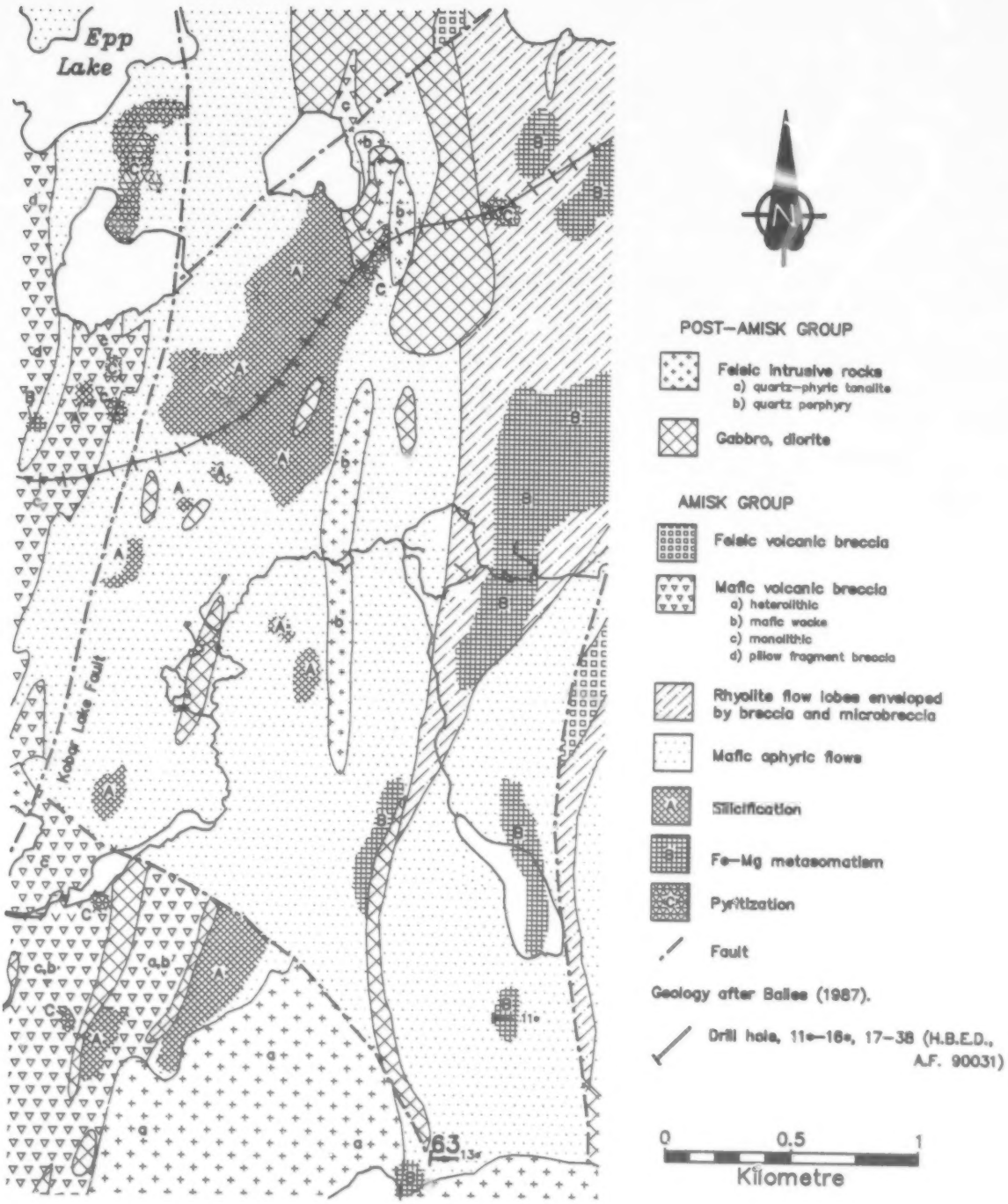



*Figure 63-1: Geological setting of occurrence 63*

LOCATION: 63

NAME: Mineralization intersected by diamond drilling
UTM: 6068471N/424024E
ACCESS: Drill roads.

AREA: 1.75 km east of Morgan Lake
AIRPHOTO: A26366-159

EXPLORATION SUMMARY:

HBED drilled one hole (DDH 13) to a depth of 158 m on the Pot 33 claim in 1955 (A.F. 90031).

GEOLOGICAL SETTING:

The general area of occurrence 63 is underlain by Amisk Group aphyric mafic flows that have undergone pervasive Fe-Mg metasomatism (Fig. 63-1). Silicified and garnetiferous sections that occur locally are described in the drill log.

MINERALIZATION:

Pyrite, pyrrhotite and lesser chalcopyrite are present as minor disseminations throughout the uppermost 115 m of core. Interspersed in this section are bands of near solid to solid pyrrhotite and pyrite with rare to minor chalcopyrite, particularly from 40.2 to 45.0 m and from 102.3 to 112.1 m.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation. Near solid sulphide mineralization associated with altered mafic volcanic rocks.

REFERENCES:

Assessment File 90031
Manitoba Energy and Mines, Minerals Division.

Bailes, A. H.
1987: Chisel-Morgan lakes; Manitoba Energy and Mines, Preliminary Map 1987S-1, 1:15 840.

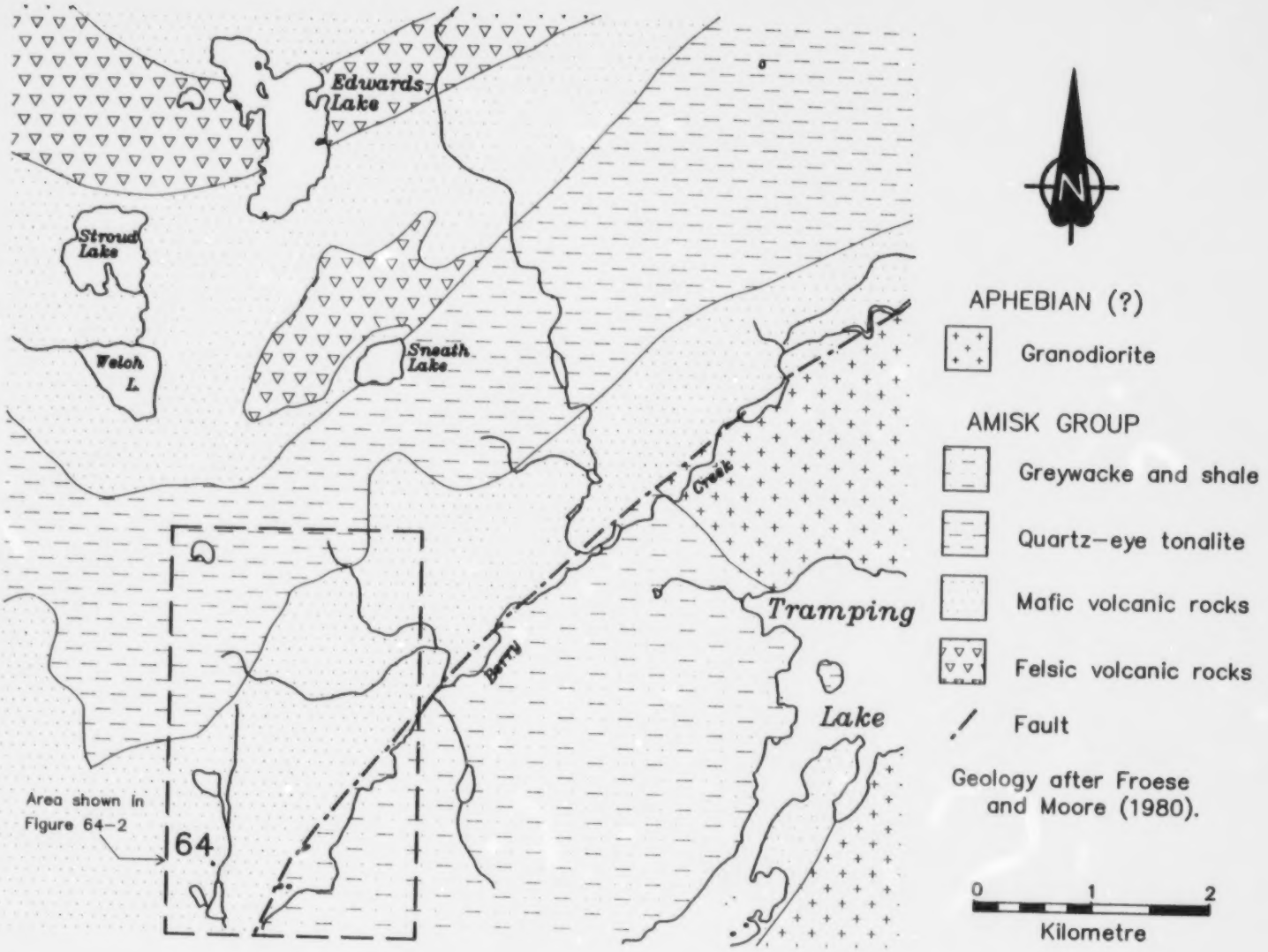



*Figure 64-1: Geological setting of occurrence 64*

**LOCATION: 64**

**NAME: Mineralization intersected by diamond drilling**
**UTM: 6067776N/429390E**
**ACCESS: Drill roads.**

**AREA: 4 km west of Tramping Lake near Berry Creek**
**AIRPHOTO: A26366-182**

EXPLORATION SUMMARY:

HBED performed a ground EM survey (A.F. 90231) and drilled 4 holes totalling 559 m (A.F. 90050) on the Ant claims in 1955-56. In 1968 the ground was restaked by P. Charles and assigned to Falconbridge Nickel Mines Limited who conducted a AFMAG longwire survey in 1970 (A.F. 90023). A.C. Borgstrom staked the area in 1973. Granges Exploration Limited drilled 2 holes totalling 135 m in 1976 (A.F. 92195). The claims lapsed in 1979. In 1986 the area was staked as several adjoining claims for Granges Exploration Ltd., Mark Kreczmer, and HBED, the current (1988) owners.

GEOLOGICAL SETTING:

The general area of occurrence 64 is underlain by mafic volcanic rocks flanked to the north by quartz-eye tonalite and to the east by greywacke and shale (Fig. 64-1). The mafic volcanic rocks, greywacke and shale have been assigned to the Amisk Group. The Berry Creek Fault occurs 0.75 km to the east of the occurrence. Occurrence 64 occurs within variably altered mafic to intermediate volcanic rocks. Alteration is characterized by chloritic, biotitic, sericitic and siliceous sections (Fig. 64-1).

MINERALIZATION:

Lengthy sections of drill core contain minor disseminated pyrrhotite, pyrite, and rare chalcopyrite. Several sections of near solid to solid pyrite and/or pyrrhotite occur in all but one drill hole (Z-25, Fig. 64-2). The more notable intersections include:

1. DDH Z-26: 8.4 m core length of solid to near solid pyrrhotite, lesser pyrite, rare chalcopyrite and sphalerite;
2. DDH Z-24: 5.6 m core length of near solid pyrrhotite-pyrite with minor sphalerite and rare chalcopyrite;
3. DDH Z-27: 8.2 m core length of silicified chloritic sericitic mafic volcanic rock containing several layers of near solid pyrrhotite that are usually less than 25 cm thick; also,
4. DDH Z-27: 5.2 m core length of dacitic volcanic rock with minor to near solid pyrrhotite and pyrite, and rare sphalerite and chalcopyrite;
5. R-75-53A: 2.4 m true width of solid pyrite and several shorter sections (0.5-1.5 m wide) of near solid pyrite and dacitic volcanic rocks.

GEOCHEMICAL DATA:

Assays are available only from drill logs for holes R-75-53A and R-75-48 (A.F. 92195). In DDH R-75-53A, the values reported were 0.03-0.92 g/t Au, 1.7-6.2 g/t Ag, 0.04-0.32% Cu, and 0.01-0.83% Zn. In DDH R-75-48, the values reported were 2.7-4.8 g/t Ag, 0.13-0.18% Cu, 0.02-0.17% Zn.

CLASSIFICATION:

Chemical sediment-type deposit in mafic to intermediate volcanic rocks.

REFERENCES:

Assessment Files 90023, 90050, 90231, 92195
Manitoba Energy and Mines, Minerals Division

Froese, E. and Moore, J.M.
1980: Metamorphism in the Snow Lake area, Manitoba; Geological Survey of Canada, Paper 78-27, 16 p.

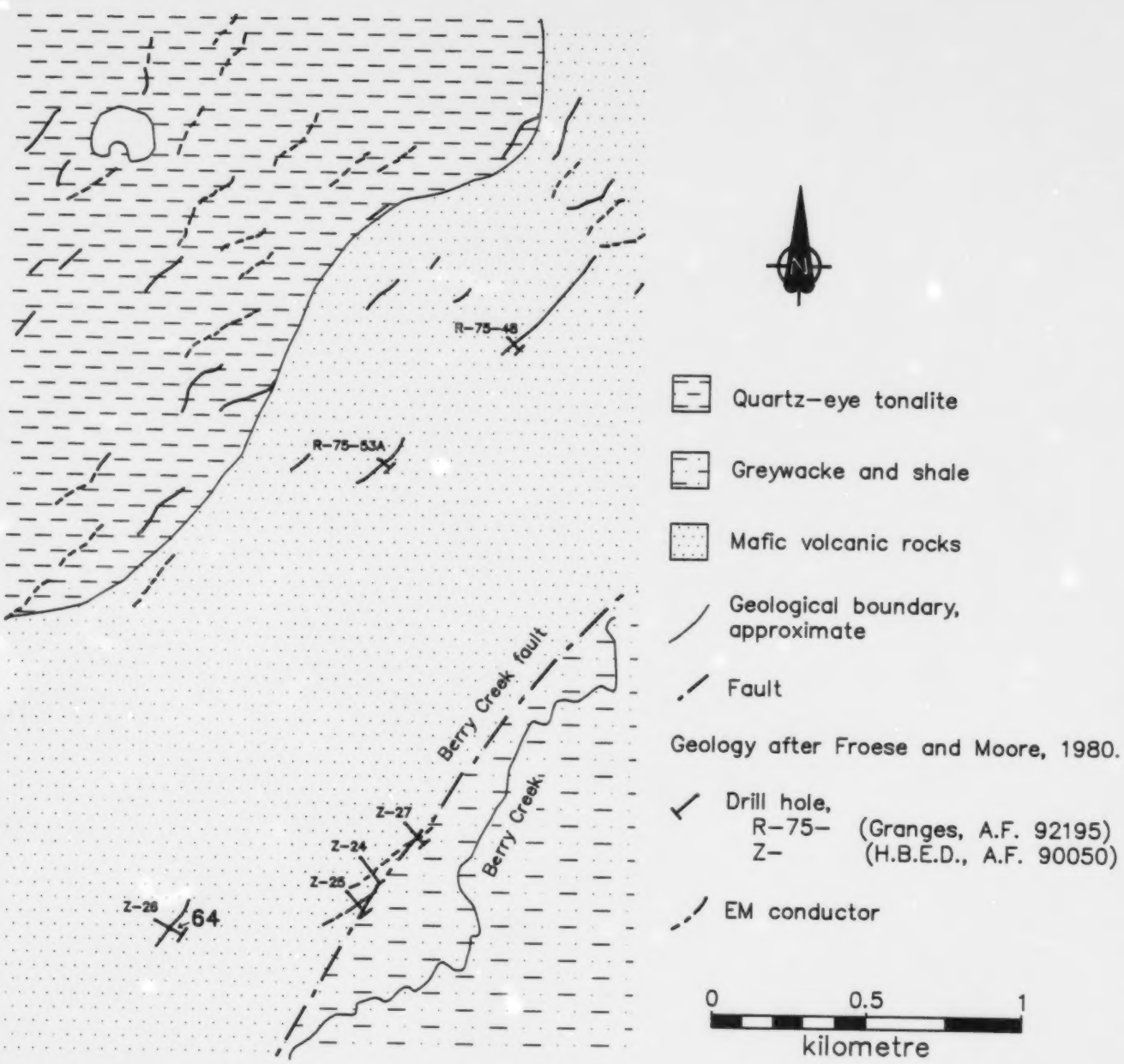



*Figure 64-2: Geology, geophysical anomalies and drill hole locations at occurrence 64*

**LOCATION: 65**

**NAME: MORGAN LAKE EAST; JAC GROUP**
**UTM: 6068053N/427854E**
**ACCESS: Drill roads, traverse south from Provincial Hwy. 395.**

**AREA: 2.5 km northeast of Bujarski Lake**
**AIRPHOTO: A26366-265**

EXPLORATION SUMMARY:

The area was first staked in 1954 as the Jac claims by G.G. Hogg and J. Brain, with all interests transferred to D. Banks. Selco Exploration Company Limited conducted a ground EM survey and drilled 8 holes totalling 665 m (3 holes totalling 56 m were abandoned before bedrock) in 1955-56 (A.F. 90024, 90065). The claims were cancelled in 1957-58. G. Rapson and G. Zimmer staked the ground in 1963. Kerr Addison Mines Limited carried out an EM survey over part of the area in 1964 (A.F. 90238). HBED covered another portion of the area with an EM survey in 1965 (A.F. 91947). The Pot claims were dropped in 1966. Subsequent owners include G. Grindle (1971-73) and J.R. Parres (1973-76). The current (1988) owners are HBED (Pen 4157, acquired in 1985) and Granges Exploration Limited (Kix 8, acquired in 1984).

GEOLOGICAL SETTING:

The general area of occurrence 65 is underlain by mafic volcanic rocks flanked to the north by quartz-eye tonalite and to the west by felsic volcanic rocks. These rock units have been assigned to the Amisk Group. Occurrence 65 is hosted by mafic to intermediate volcanic rocks that contain some silicified and chloritic sections (Fig. 65-1). Hole DD-3 intersected "hornblende gneiss" to "hornblende schist" that is garnetiferous or has a porphyroblastic "spotted" texture in places (A.F. 90065).

MINERALIZATION:

Disseminated (up to 15%) pyrrhotite and pyrite are common throughout long sections of drill core. In addition, near solid to solid pyrrhotite-pyrite sections, usually 1 m or less in core length, occur locally in each of the drill holes. In hole DD-1, a 3.5 m (true width) intersection constituted massive pyrrhotite with 10% pyrite and 2% chalcopyrite. Hole DD-3 intersected 9.2 m (true width) of disseminated (10%-15%) to solid pyrrhotite-pyrite.

GEOCHEMICAL DATA:

The chalcopyrite-bearing solid sulphide intersection in hole DD-3 assayed 0.39% Cu, 0.82% Zn and nil Au. Assays were not included with logs from the other drill holes.

CLASSIFICATION:

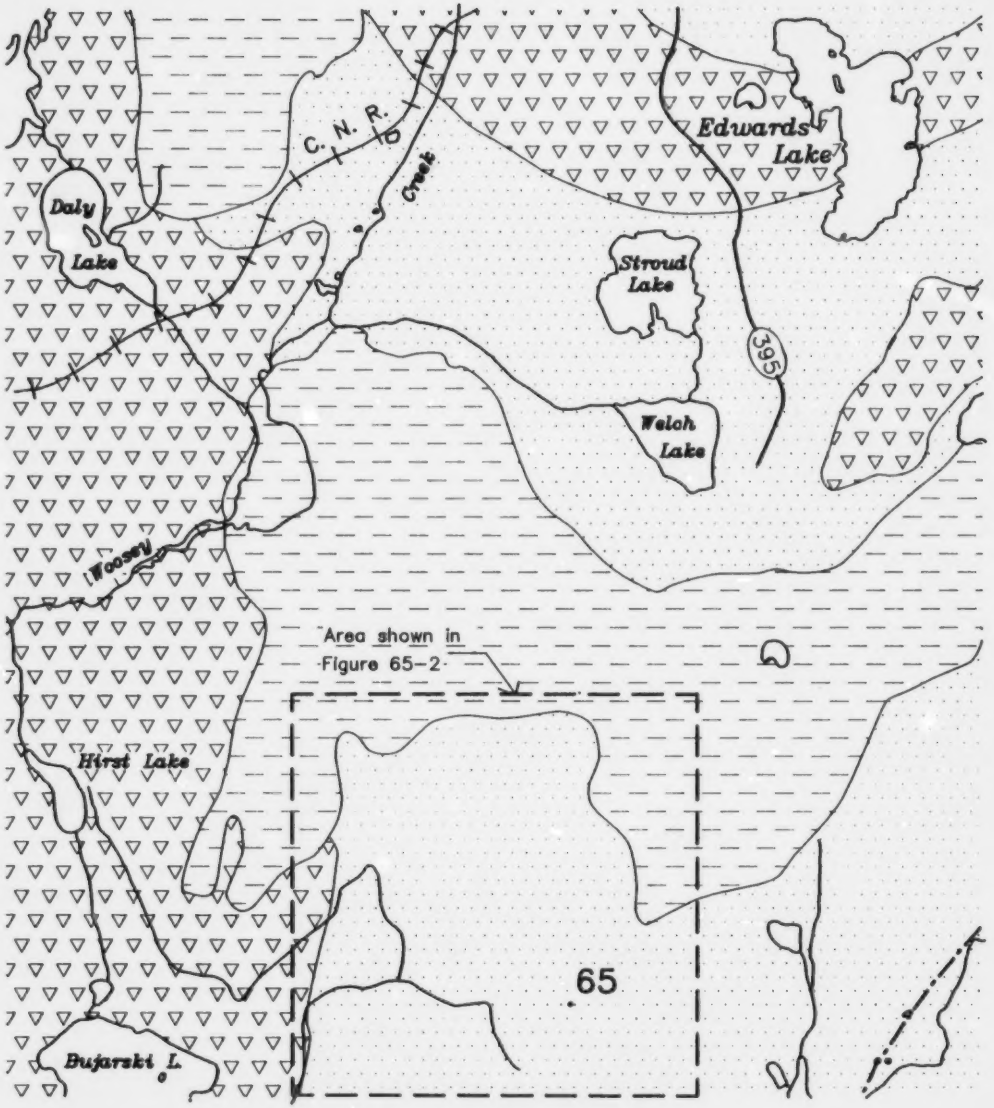
Chemical sediment type deposit; sulphide facies iron formation. The well mineralized sections in drill core do not form a discrete zone with a uniform thickness; the near solid to solid sections are apparently discontinuous.

REFERENCES:

Assessment Files 90024, 90065, 90238, 91947
Manitoba Energy and Mines, Minerals Division.

Froese, E. and Moore, J.M.
1980: Metamorphism in the Snow Lake area, Manitoba; Geological Survey of Canada, Paper 78-27, 16 p.

Mineral Inventory Card NTS 63K/16 Zn5
Manitoba Energy and Mines, Minerals Division.



AMISK GROUP

Quartz–eye tonalite

Mafic volcanic rocks

Felsic volcanic rocks

Fault

Geology after Froese and Moore (1980).

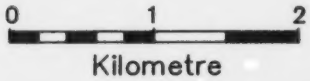



*Figure 65-1: Geological setting of occurrence 65*

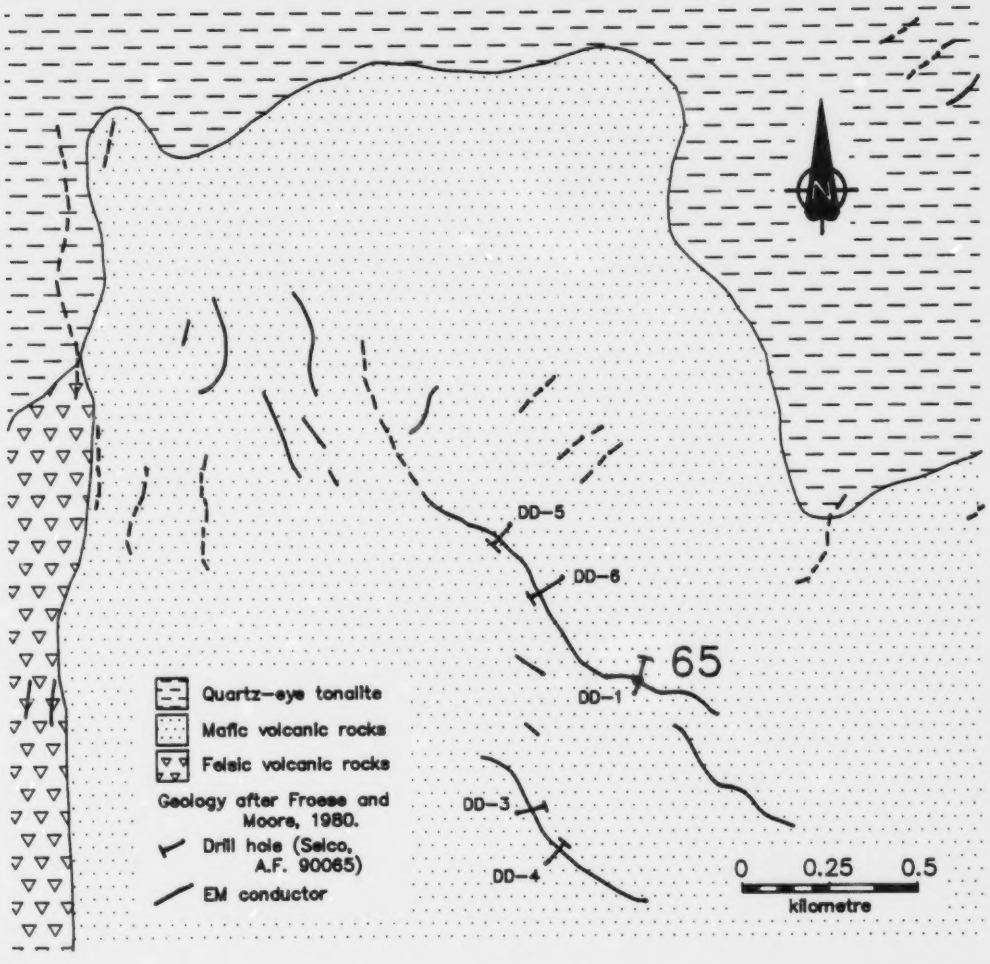



*Figure 65-2: Geology, geophysical anomalies and drill hole locations at occurrence 65*

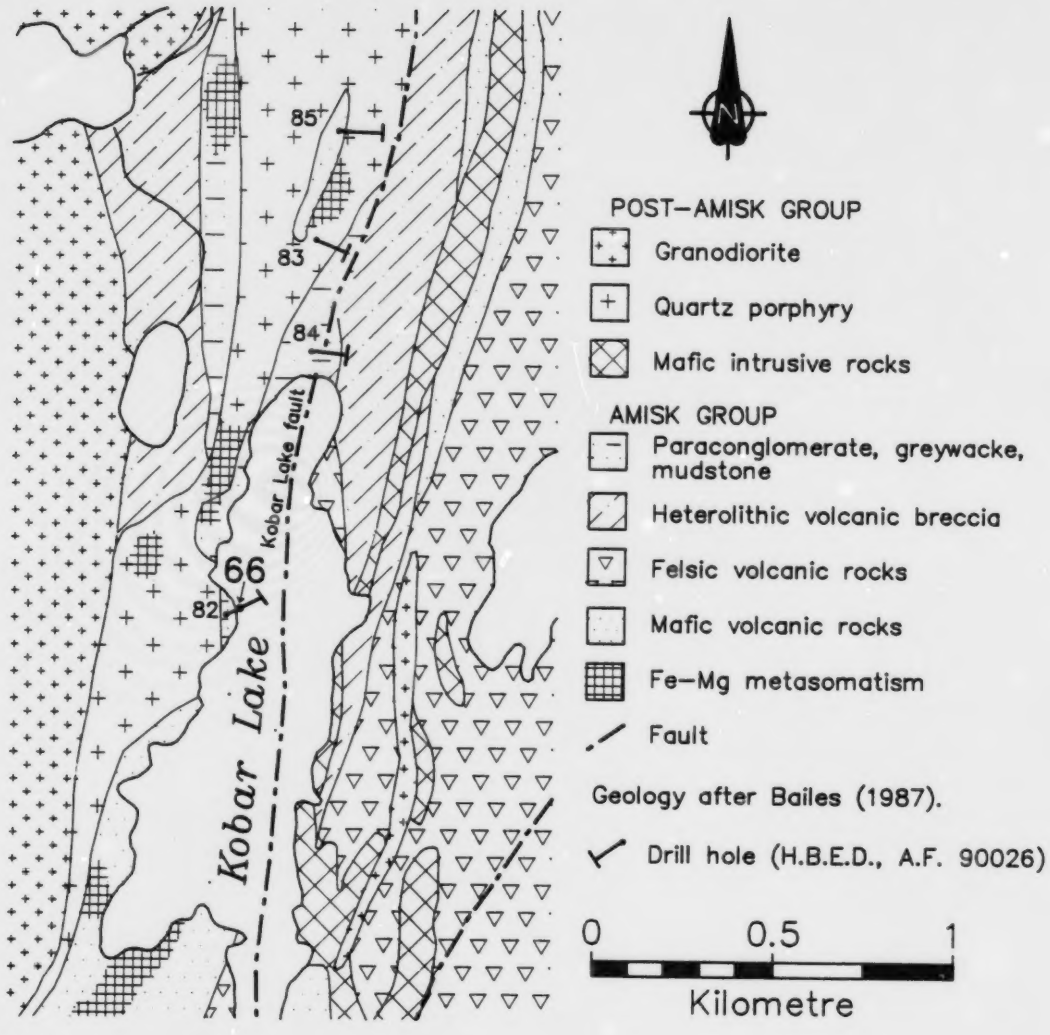



*Figure 66-1: Geological setting of occurrence 66*

**LOCATION: 66**

**NAME: Mineralization intersected by diamond drilling**
**UTM: 6077235N/422821E**
**ACCESS: Bush aircraft.**

**AREA: North end of Kobar Lake**
**AIRPHOTO: A26367-19**

EXPLORATION SUMMARY:

HBED drilled 4 holes totalling 451 m in 1956 (A.F. 90026). The property is currently (1988) held by HBED, who restaked the ground in 1978 as part of C.B. 6490.

GEOLOGICAL SETTING:

The general area of mineral occurrence 66 is underlain by Amisk Group greywacke, flanked to the west by quartz porphyry and to the east by Amisk Group heterolithic breccia and felsic volcanic rocks (Fig. 66-1). Diamond drilling at the occurrence intersected argillite, quartz porphyry and lesser mafic volcanic rocks. Fe-Mg alteration mineral assemblages characterized by garnet + chlorite ± biotite ± amphibole were observed locally. Drill logs indicate the presence of garnet, chlorite, biotite, sericite and hornblende.

MINERALIZATION:

Drill logs describe minor disseminated pyrrhotite-pyrite at irregular intervals in the cores. Rare chalcopyrite was noted in DDH-82 and -85; rare sphalerite occurs in a different part of DDH-82 and in DDH-83.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Disseminated mineralization - not classified. Minor sulphide mineralization disseminated in argillite and quartz porphyry.

REFERENCES:

Assessment File 90026
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1987: Chisel-Morgan lakes; Manitoba Energy and Mines, Preliminary Map 1987-S-1, 1:15 840

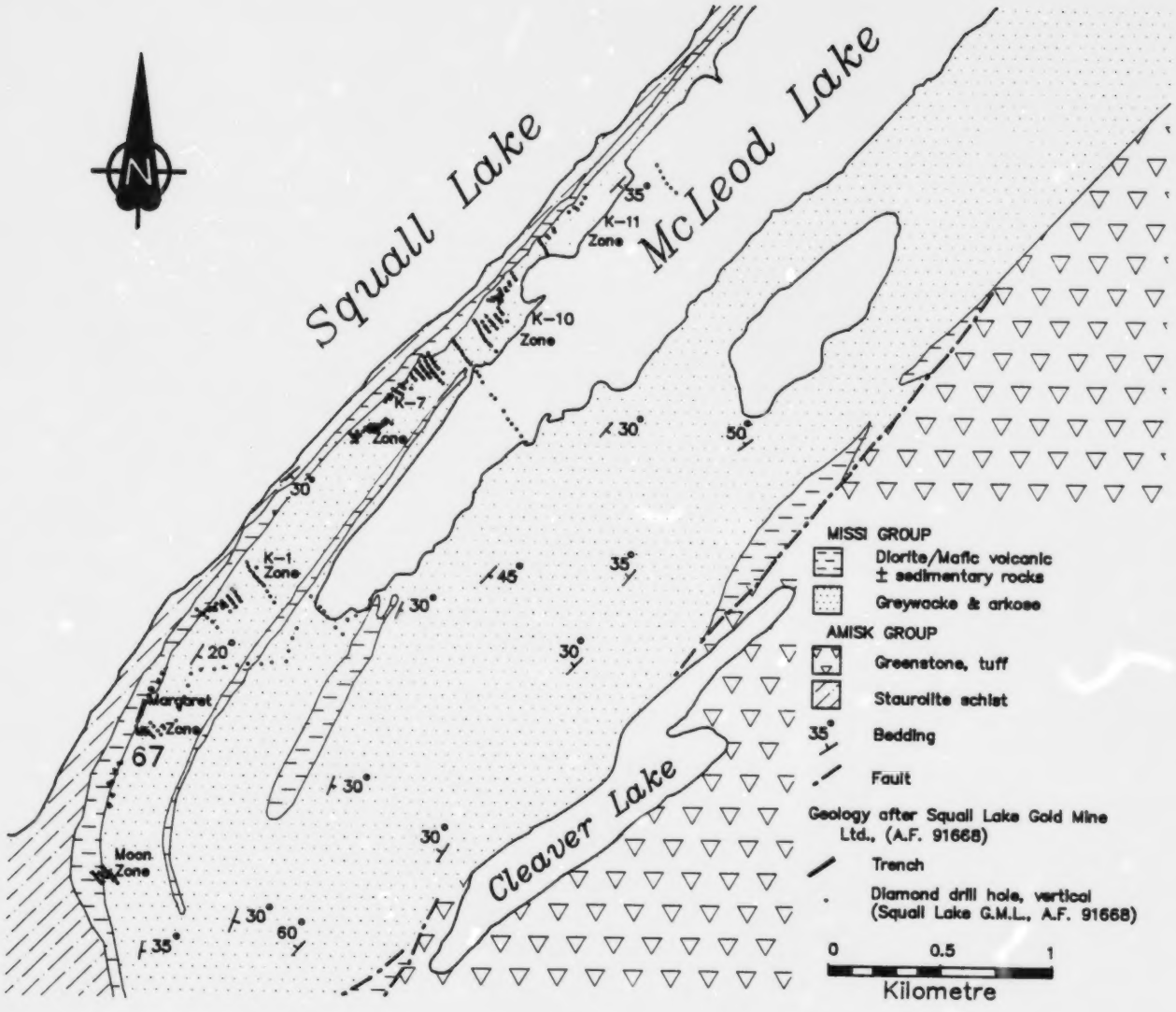



*Figure 67-1: Geological setting of occurrence 67*

**LOCATION: 67**

NAME: SQUALL LAKE (MARGARET ZONE; MOON, GERTIE ZONE; K-10 ZONE)

UTM: 6087344N/430843E

ACCESS: Bush road.

AREA: Southeast side of Squall Lake

AIRPHOTO: A26366-248

EXPLORATION SUMMARY:

The first claim over the deposit was recorded by A. Peberdy who held the ground from 1924-26. Numerous parties held the ground from 1926-1944 but substantial exploration work was not reported during this period. Wekusko Consolidated Limited staked and optioned numerous claims in the area in 1944-45. They carried out a 8309 m diamond drilling program and received assays that ranged from 3.09 g/t to 14.4 g/t Au over 0.76-2.75 m (Richardson and Ostry, 1987). Squall Lake Gold Mines Limited acquired the ground in 1945 and drilled an additional 7642 m in 1945-46 (Mineral Inventory Card 63K/16NE Au10). Ore dressing and metallurgical tests on drill core rejects yielded recoveries of up to 94.5% using a cyanidation process (A.F. 91668). Further trenching and sampling were done in 1948. Leases were issued from 1949 to 1977. In 1977 Stan Major staked part of the property and it was subsequently transferred to Eldorado Exploration Limited, Corporate Oil and Gas Limited, W. Bruce Dunlop Limited (NPL) and Camflo Mines Limited. HBED staked the area previously known as the Moon/Gertie Zone (Fig. 67-1) in 1978. Magnetometer, electromagnetic, VLF-EM and induced polarizaton surveys as well as mapping and diamond drilling (unspecified amount) were carried out. In 1984 Camflo announced drill indicated reserves of 1 088 621 tonnes grading 6.85 g/t Au. Camflo amalgamated with Barrick Resources Corporation in 1984. Barrick and Zenco Resources Incorporated undertook a further 5000 m of diamond drilling in 1984 and outlined near surface mineralization totalling 680 000 tonnes grading 3.43 g/t. Zenco acquired 100% interest in the property in 1986 and conducted 3658 m of diamond drilling in 1987 (Mineral Inventory Card 63K/16NE Au10; Richardson and Ostry, 1987).

GEOLOGICAL SETTING:

The general area of occurrence 67 is underlain by greywacke and arkose flanked to the east and west by mafic intrusive, volcanic and/or sedimentary layers (Fig. 67-1). These rock units have been assigned to the Missi Group. The Squall Lake deposit and other associated gold occurrences between Squall and McLeod lakes are located on the northwest limb of the northeast-trending McLeod Lake Synform with a combined strike length of at least 2.7 km (A.F. 91668) (Fig. 67-1). The rocks consist of garnet-staurolite schist and arkosic gneisses separated by less than 200 metres of rocks described by Harrison (1949) as an altered biotite hornblende diorite sill. Gale and Ostry (1984) suggest that well layered mafic metavolcanic and/or metasedimentary rocks may form a component of the 'sill'.

MINERALIZATION:

The following description is summarized from Harrison (1949). Gold mineralization is hosted by three subparallel discontinuous lenses over a stratigraphic thickness of 60 m near the hanging wall contact of the diorite sill with arkosic gneisses (Fig. 67-2). The upper zone consists of a quartz ± carbonate stockwork with erratic Au values in the arkosic rocks. The middle main zone is a series of lenses at or near the contact; the lenses are shaped like "flattened cigars", dip 15°-25° SW, and plunge 5°-10° NE (Harrison, 1949). The lower zone, up to 2 m wide and more continuous, occurs within silicified and carbonatized diorite. Auriferous zones are silicified, carbonatized, chloritized and contain abundant albite. Gold is primarily associated with medium-to-coarse-grained arsenopyrite. The thickness of the gold-bearing intersections averages less than 1.5 m (A.F. 91668). Pyrite, pyrrhotite, chalcopyrite and sphalerite are also present (A.F. 91668).

GEOCHEMICAL DATA:

Drill indicated reserves in 1984 were estimated at 1 088 621 tonnes grading 6.85 g/t Au by Camflo Mines (Mineral Inventory Card 63K/16NE Au10). Further drilling outlined near surface mineralization consisting of 680 000 tonnes grading 3.43 g/t Au (Richardson and Ostry, 1987).

CLASSIFICATION:

Disseminated mineralization - not classified. Arsenopyrite and gold exhibit a spatial association with a stratabound set of quartz veins within a of biotite diorite and/or mafic metavolcanic ± sedimentary rocks and quartzofeldspathic gneiss sequence. It is unclear whether or not the gold and/or arsenopyrite mineralization are genetically related to the quartz veins.

REFERENCES:

Assessment File 91668
Manitoba Energy and Mines, Minerals Division.

Froese, E. and Moore, J.M.
1980: Metamorphism in the Snow Lake area; Geological Survey of Canada, Paper 78-27, 16 p.

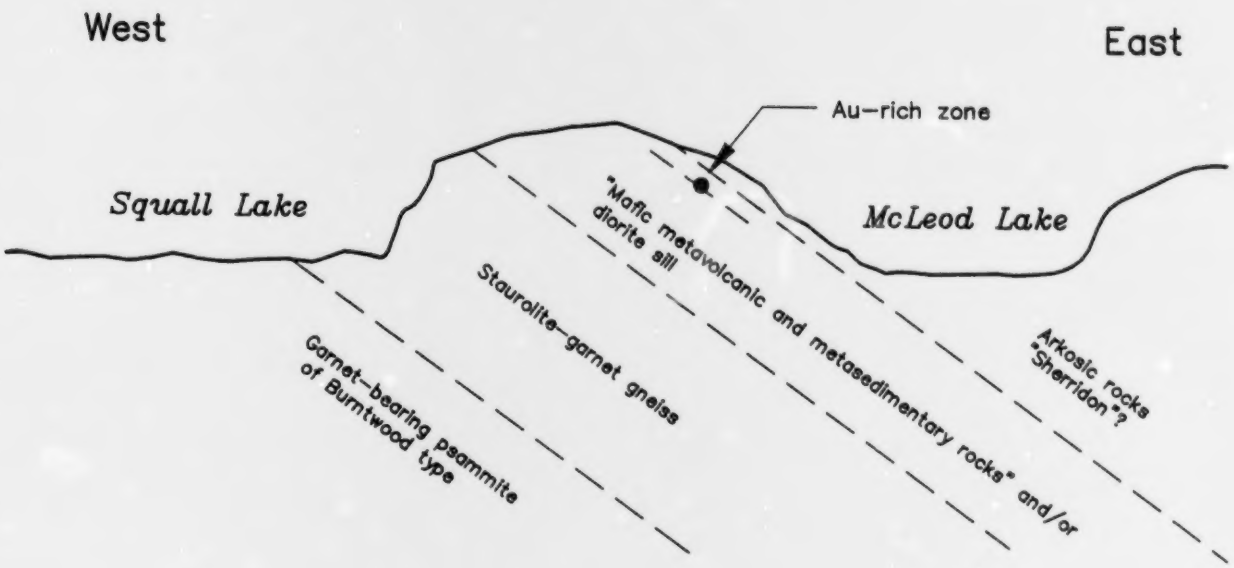



*Figure 67-2: Schematic section showing the stratigraphic position of gold mineralization at Squall Lake*

Gale, G.H. and Ostry, G.

1984: Stratabound gold mineralization in the Kisseynew gneiss terrain; Manitoba Mineral Resources Division, Report of Field Activities 1984, p. 73-80.

Galley, A.G., Ziehlke, D.V., Franklin, J.M., Ames, D.E. and Gordon, T.M.

1986: Gold mineralization in the Snow Lake-Wekusko Lake region, Manitoba; in Gold in the Western Shield (L.A. Clark, ed.); Canadian Institute of Mining and Metallurgy, Special Volume, p. 379-398.

Harrison, J.M.

1949: Geology and mineral deposits of File-Tramping lakes area; Geological Survey of Canada, Memoir 250, p. 76-78.

Mineral Inventory Card 63K/16NE Au8

Manitoba Energy and Mines, Minerals Division.

Mineral Inventory Card 63K/16NE Au9

Manitoba Energy and Mines, Minerals Division.

Mineral Inventory Card 63K/16NE Au10

Manitoba Energy and Mines, Minerals Division.

Richardson, D.J. and Ostry, G.

1986: Gold deposits of Manitoba; Manitoba Energy and Mines, Economic Geology Report ER86-1, p. 76-77.

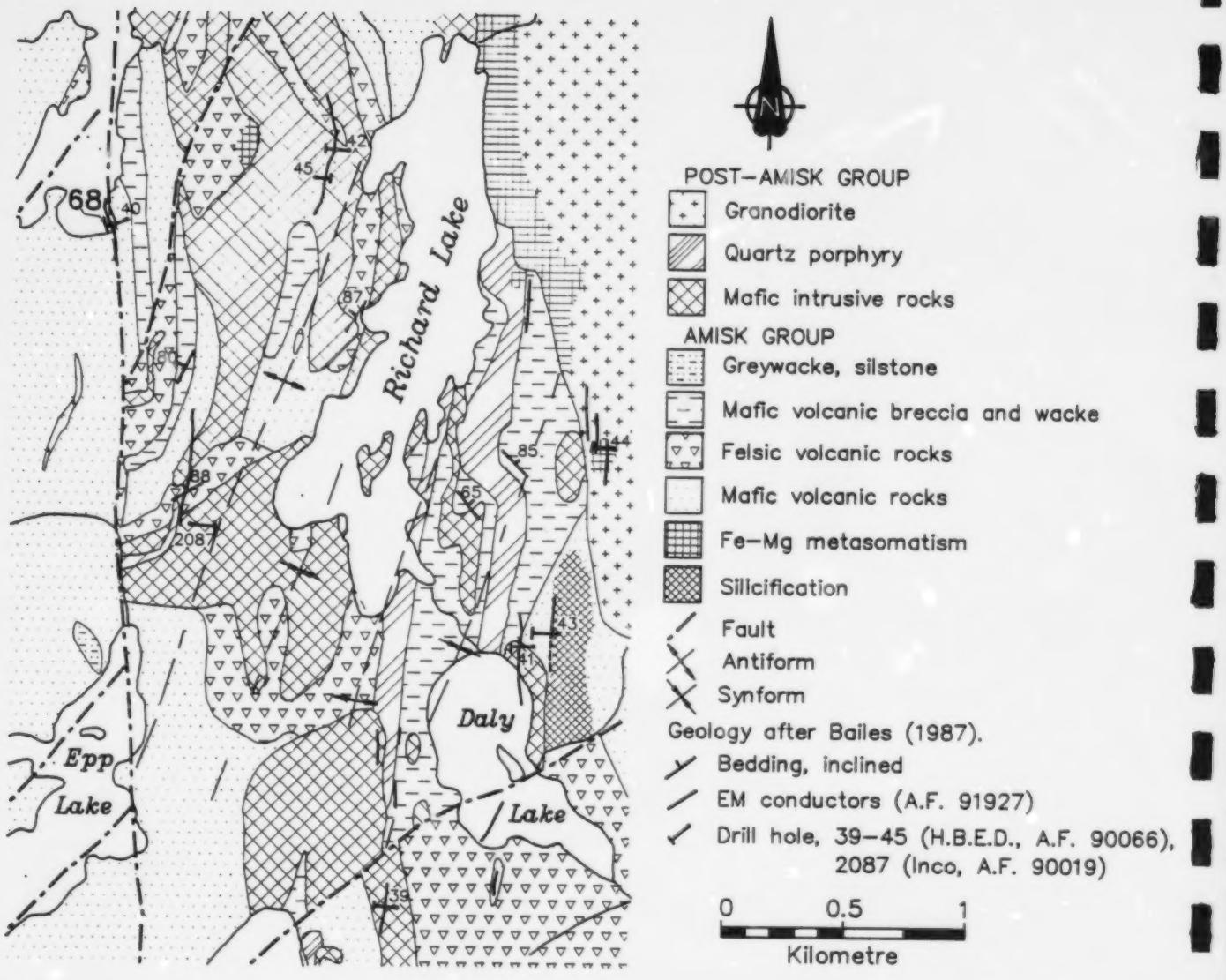



*Figure 68-1: Geological setting of occurrence 68*

**LOCATION: 68**

**NAME: Mineralization intersected by diamond drilling**
**UTM: 6075466N/422878E**
**ACCESS: Bush aircraft.**

**AREA: Richard-Daly lakes area**
**AIRPHOTO: A26366-155**

EXPLORATION SUMMARY:

International Nickel Company of Canada Limited drilled a 123 m long hole on claim Cran 2 in 1951 (A.F. 90019). In 1955 HBED carried out an HLEM survey and drilled 7 holes on the Pan claims totalling 814 m (A.F. 91927, 90066). The area is currently (1988) held by Falconbridge Limited who staked the ground in 1968.

GEOLOGICAL SETTING:

The general area of occurrence 68 is underlain by mafic volcanic rocks, flanked to the east by mafic volcanic breccia and wacke, mafic intrusions and felsic volcanic rocks. All the rock units in the area with the exception of the mafic intrusions have been assigned to the Amisk Group. At the occurrence drill holes intersected alternating layers (2-50 m core lengths) of garnetiferous mafic volcanic flows and siliceous graphitic sedimentary rocks or "quartzite" (Fig. 68-1). Some of the drill holes were collared in intrusive rocks but intersected the volcanic and sedimentary rocks down hole.

MINERALIZATION:

The siliceous graphitic sedimentary rocks contain minor to moderate amounts of disseminated pyrrhotite and subordinate pyrite. Near solid to solid sulphide streaks or bands less than 1 m in core length are also present. Less common are mafic volcanic rocks containing sections of minor pyrite in irregular, discontinuous stringers and disseminations.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment-type deposit. Sulphide minerals associated with siliceous or silicified graphitic sedimentary rocks interlayered with mafic volcanic flows.

REFERENCES:

Assessment Files 90019, 90066, 91927
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1987: Chisel-Morgan lakes; Manitoba Energy and Mines, Preliminary Map 1987S-1, 1:15 840

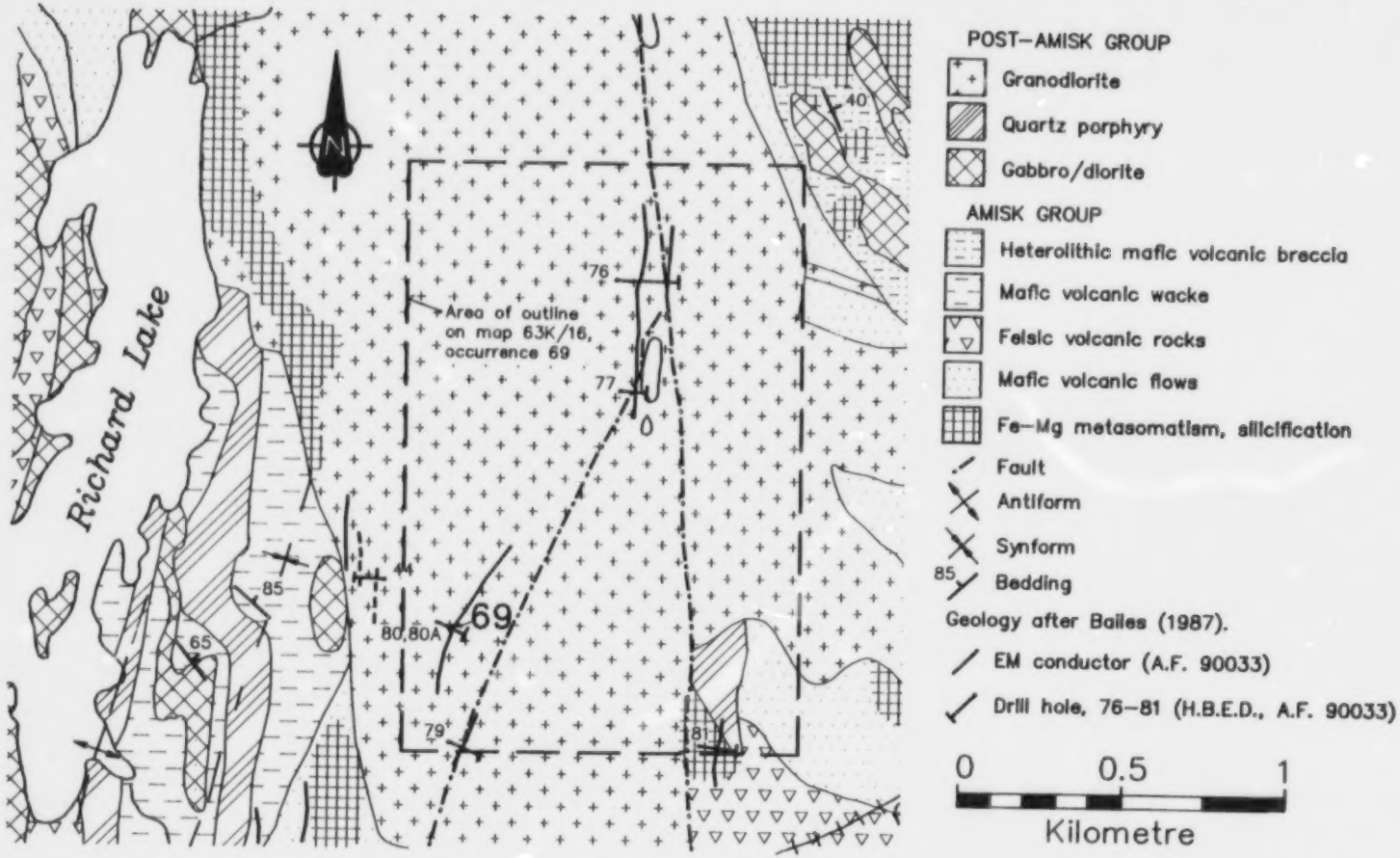



*Figure 69-1: Geological setting of occurrence 69*

**LOCATION: 69**

NAME: Mineralization intersected by diamond drilling
UTM: 6074477N/425186E
ACCESS: Bush aircraft and traverse.

AREA: 800 m east of Richard Lake.
AIRPHOTO: A26366-261

EXPLORATION HISTORY:

HBED drilled five holes totalling 556 m on the Ox claims in 1955 (A.F. 90033). The ground is currently held as several claims, some of which have been owned by Falconbridge Limited since 1968 and 1980, and others by HBED since 1977 and 1980-81.

GEOLOGICAL SETTING:

The general area of occurrence 69 is underlain by post-Amisk granodiorite flanked to the west by Amisk Group mafic volcanic wacke, mafic intrusions and quartz porphyry. The occurrence is defined by an electromagnetic conductor that parallels a northeast-trending fault (Fig. 69-1). At the occurrence drill holes intersected quartz-phyric intrusive rocks with granodiorite to tonalite compositions. Local garnetiferous and/or hematized sections were noted in drill logs. Other less common alteration minerals include sericite and staurolite; epidote may be concentrated along fractures. Bailes (1987) has noted areas of Fe-Mg alteration within this intrusive body (Fig. 69-1).

MINERALIZATION:

Trace to minor pyrite is disseminated in the granodiorite. Less than 1% chalcopyrite was noted in drill core.

CLASSIFICATION:

Disseminated mineralization - not classified. Minor pyrite disseminated in felsic intrusive rocks. The presence of pyrite is probably related to the alteration reflected by a garnet ± sericite ± staurolite ± hematite mineralogy.

REFERENCES:

Assessment File 90033
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1987: Chisel-Morgan lakes; Manitoba Energy and Mines, Preliminary Map 1987S-1, 1:15 840.

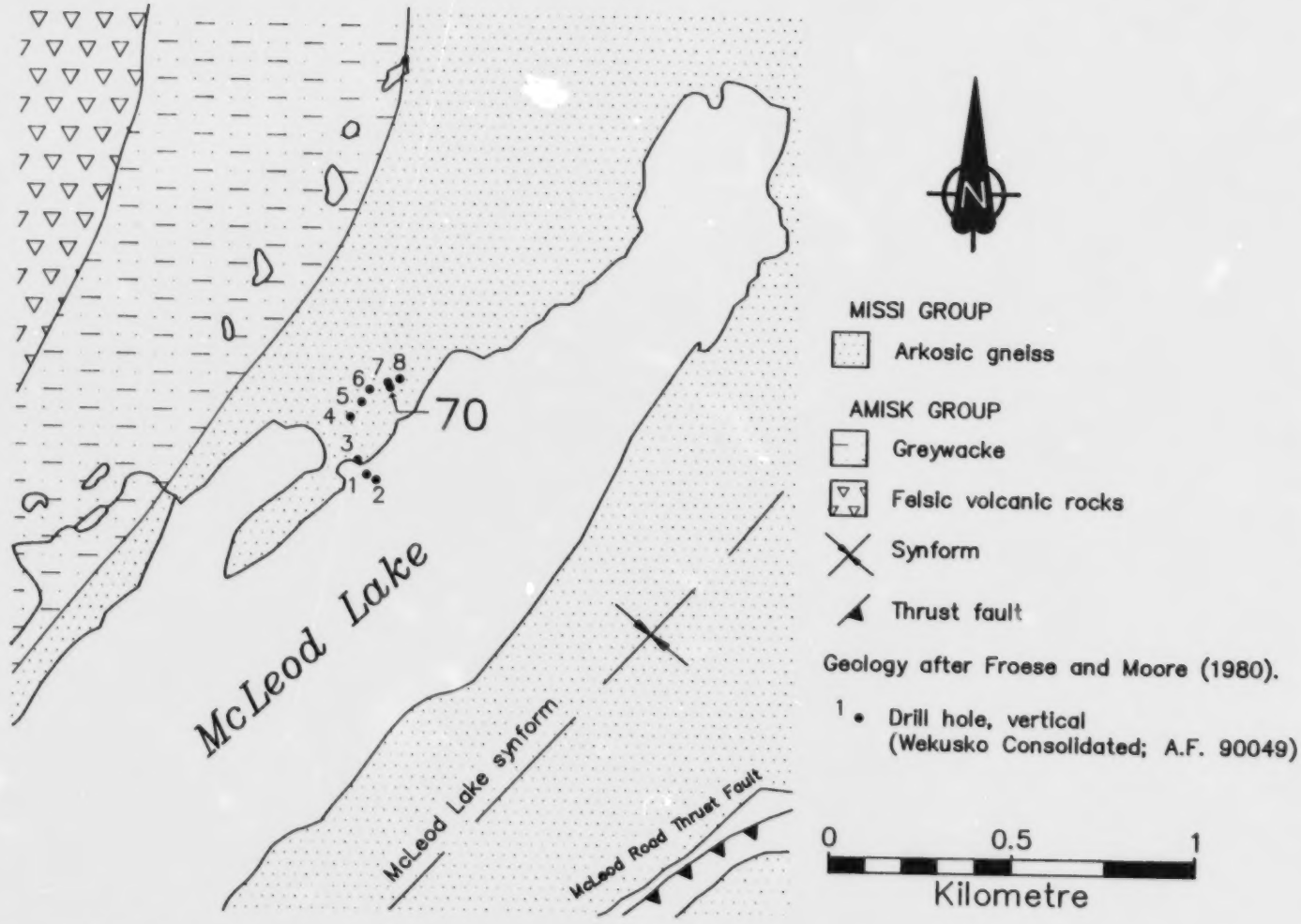



*Figure 70-1: Geological setting of occurrence 70*

**LOCATION:** 70

**NAME:** Mineralization intersected by diamond drilling
**UTM:** 6091396N/434636E
**ACCESS:** Bush roads and traverse.

**AREA:**
**AIRPHOTO:** A25366-105

EXPLORATION SUMMARY:

Wekusko Consolidated Limited drilled 8 holes totalling 503 m on claims BM 17 and BB 9 in 1950 (A.F. 90049). W. Kobar staked the Miner 10 and 11 claims in 1968. Interests in the claims were transferred in 1980 to Camflo Mines Limited which later amalgamated with Barrick Resources Corporation. In 1986 Noranda Exploration Company Limited optioned the claims. In 1987 all interests reverted to W. Kobar, the current holder.

GEOLOGICAL SETTING:

The general area of occurrence 70 is underlain by Missi Group arkosic gneisses, flanked to the west by Amisk Group greywacke and felsic volcanic rocks (Fig. 70-1). Numerous medium to coarse grained dykes of unspecified composition, ranging from less than 1 to 10 m in core length, are noted in drill logs.

MINERALIZATION:

Quartz-carbonate stringers that contain minor to moderate arsenopyrite and minor chalcopyrite, pyrrhotite and pyrite occur in the dykes and the arkosic gneisses.

GEOCHEMICAL DATA:

Assays noted in drill logs range from trace to 3.8 g/t Au in dyke and arkose. Sections of drillcore with anomalous Au values are generally less than 3 m in core length.

CLASSIFICATION:

Vein-type deposit. Arsenopyrite and other sulphide mineralization and gold associated with quartz-carbonate stringers in dykes (probably mafic?) and arkosic gneiss.

REFERENCES:

Assessment File 90049
Manitoba Energy and Mines, Minerals Division.

Froese, E. and Moore, J.M.
1980: Metamorphism in the Snow Lake area; Geological Survey of Canada, Paper 78-27, 16 p.

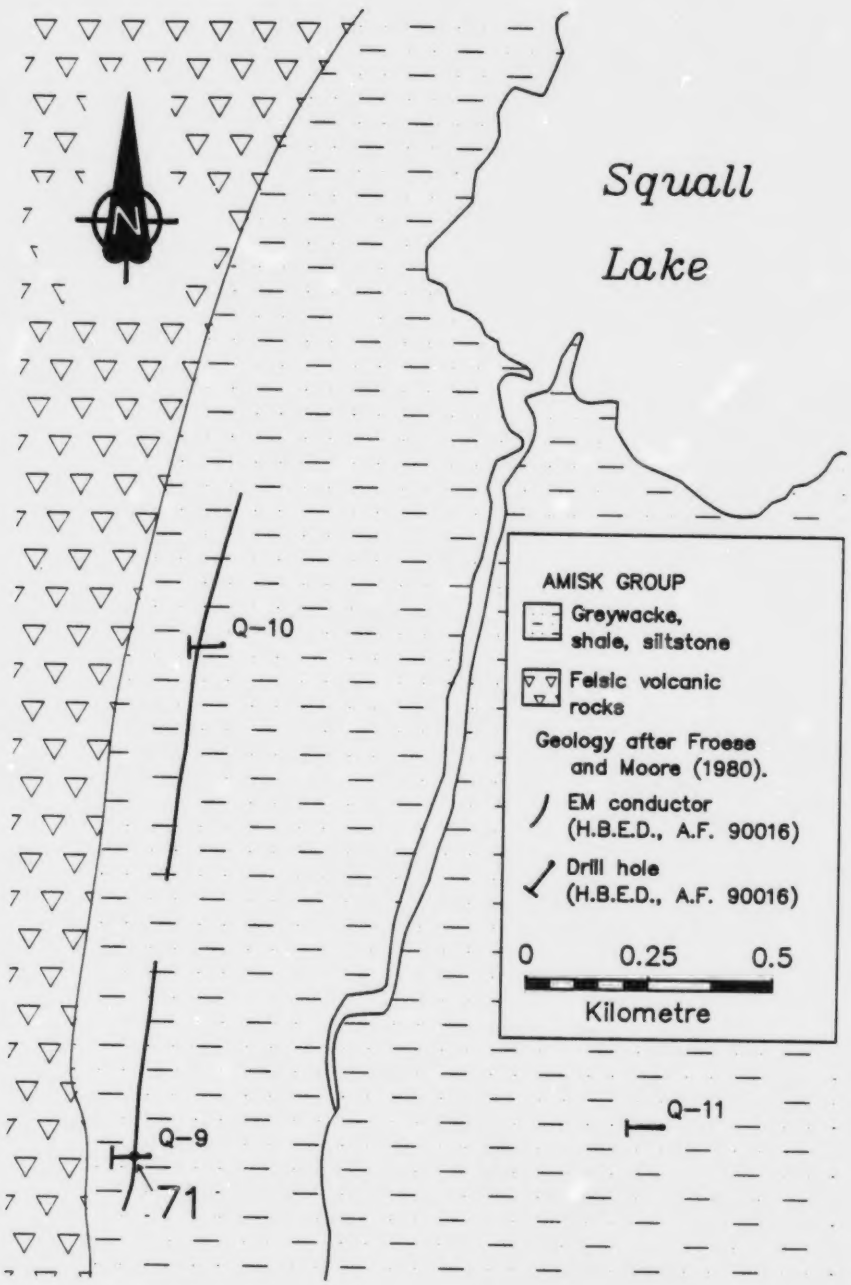



*Figure 71-1: Geological setting and drill hole locations at occurrence 71*

**LOCATION:** 71

NAME: Mineralization intersected by diamond drilling
UTM: 6085486N/428553E
ACCESS: Bush roads.

AREA: Southwest end of Squall Lake.
AIRPHOTO: A26366-194

EXPLORATION SUMMARY:

HBED conducted EM surveys over the Ox claim group in 1951 and 1956 (A.F. 90016, 90027). Two holes totalling 206 m were drilled to test EM conductors at the southwest end of Squall Lake in 1955 (Fig. 71-1) (A.F. 90016).

GEOLOGICAL SETTING:

The general area of occurrence 71 is underlain by greywacke, shale and siltstone flanked to the west by felsic volcanic rocks (Fig. 71-1). These rock units have been assigned to the Amisk Group. Drill holes intersected partly banded, graphitic and carbonate-bearing argillaceous schist and quartz-hornblende-biotite gneiss that locally contains carbonate, chlorite, muscovite and garnet (Fig. 71-1).

MINERALIZATION:

Irregular stringers of pyrite and pyrrhotite, 0.5 cm or less wide, minor blebs of pyrite and rare arsenopyrite needles occur in graphitic argillaceous schist.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment-type deposit. Minor stringer and disseminated sulphide mineralization associated with graphitic argillaceous sedimentary rocks.

REFERENCES:

Assessment Files 90016, 90027
Manitoba Energy and Mines, Minerals Division.

Froese, E. and Moore, J.M.
1980: Metamorphism in the Snow Lake area, Manitoba; Geological Survey of Canada, Paper 78-27, 16 p.

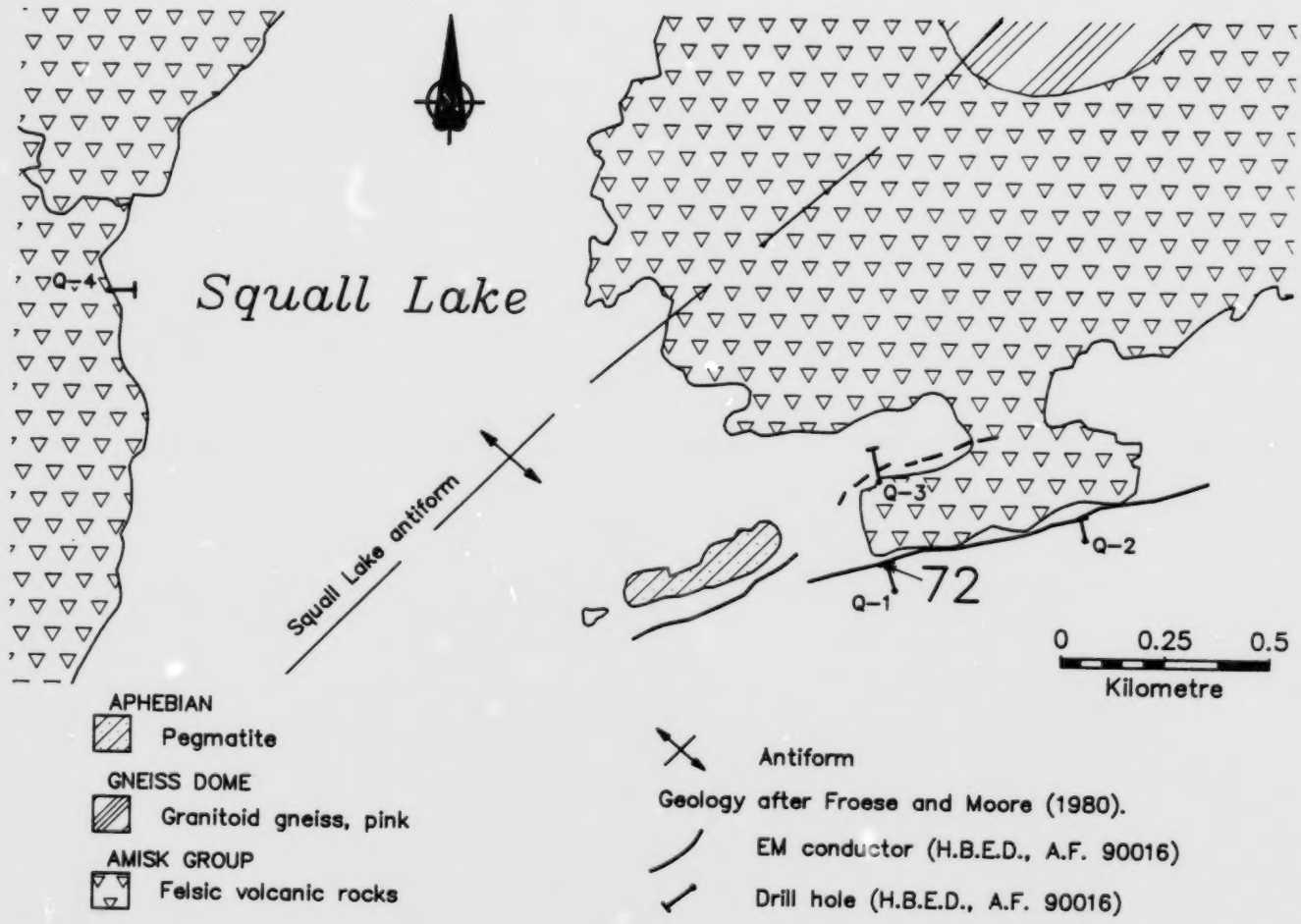



*Figure 72-1: Geological setting and drill hole locations at occurrence 72*

**LOCATION: 72**

NAME: Mineralization intersected by diamond drilling
UTM: 6089092N/430436E
ACCESS: Bush roads to Squall Lake; Bush aircraft to Squall Lake

AREA: West end of Squall Lake
AIRPHOTO: A26366-249

EXPLORATION SUMMARY:

Four holes totalling 514 m were drilled by HBED in 1955 to test EM conductors on the Ox claims (Fig. 72-1) (A.F. 90016).

GEOLOGICAL SETTING:

The general area of occurrence 72 is underlain by felsic volcanic rocks of the Amisk Group (Froese and Moore, 1980). A pegmatite occurs just north of the electromagnetic conductor that defines the occurrence (Fig. 72-1). Drill holes intersected a sequence of banded quartz ± hornblende ± garnet ± biotite gneiss. Sections of possible fragmental rocks are identified in drill logs. Some sections less than 0.5 m in core length consist of graphitic carbonate-bearing argillaceous schist.

MINERALIZATION:

Minor pyrite and pyrrhotite with traces of sphalerite and chalcopyrite are associated with graphite-bearing sections.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment-type deposit. Minor sulphide mineralization associated with graphitic argillite.

REFERENCES:

Assessment File 90016
Manitoba Energy and Mines, Minerals Division.

Froese, E. and Moore, J.M.
1980: Metamorphism in the Snow Lake area, Manitoba; Geological Survey of Canada, Paper 78-27, 16 p.

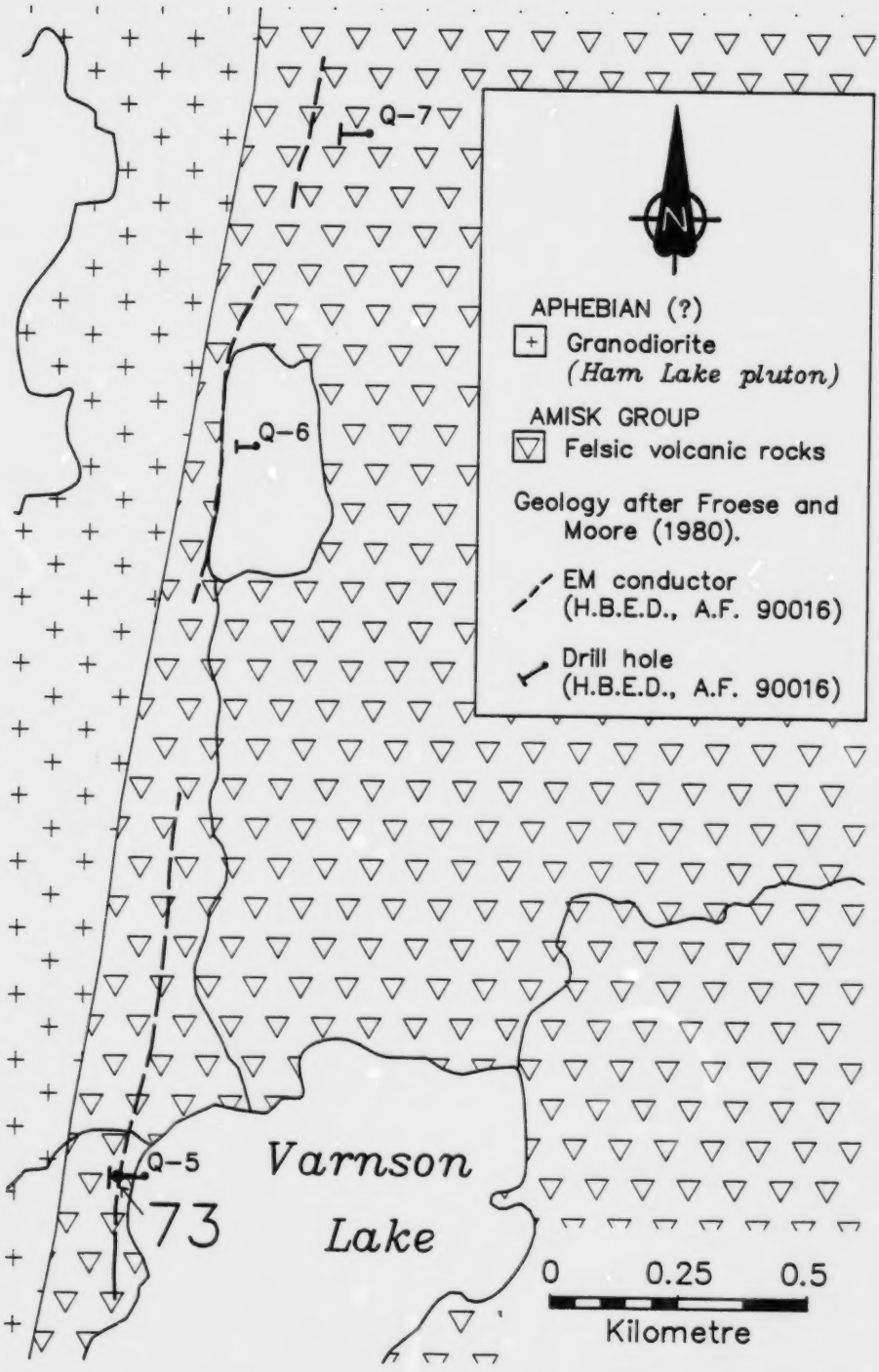



*Figure 73-1: Geological setting and drill hole locations at occurrence 73*

**LOCATION: 73**

NAME: Mineralization intersected by diamond drilling
UTM: 6087764N/425680E
ACCESS: Bush aircraft

AREA: North of Varnson Lake
AIRPHOTO: A26366-146

EXPLORATION SUMMARY:

HBED drilled three holes totalling 341 m on the Ox claims in 1955 (Fig. 73-1) (A.F. 90016).

GEOLOGICAL SETTING:

The general area of occurrence 73 is underlain by Amisk Group felsic volcanic rocks. These rocks are flanked to the west by the Ham Lake granodiorite pluton (Fig. 73-1). Drill holes Q-5 and Q-7 intersected partly banded quartz biotite gneiss and garnetiferous andesite. Froese and Moore (1980) interpreted these gneisses to represent metamorphosed felsic volcanic rocks. Local graphite bands are noted in drill logs. A third drill hole (Q-6) did not intersect bedrock.

MINERALIZATION:

Trace pyrite is associated with graphitic sections.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment-type deposit. Trace sulphide mineralization associated with graphite layers intercalated with felsic gneisses of probable volcanic origin.

REFERENCES:

Assessment File 90016
Manitoba Energy and Mines, Minerals Division.

Froese, E. and Moore, J.M.
1980: Metamorphism in the Snow Lake area, Manitoba; Geological Survey of Canada, Paper 78-27, 16 p.

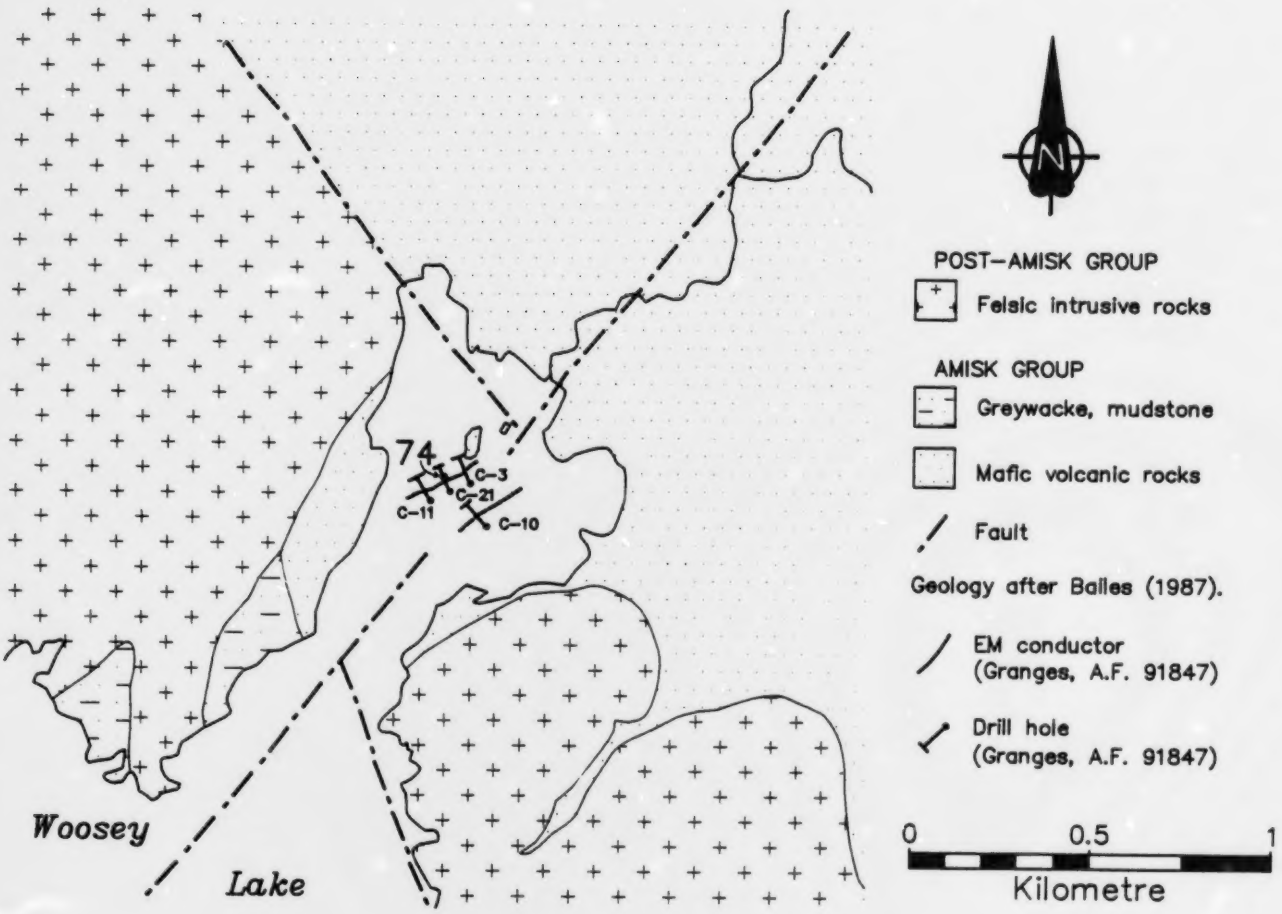



*Figure 74-1: Geological setting of occurrence 74*

**LOCATION: 74**

**NAME: Mineralization intersected by diamond drilling**
**UTM: 6073604N/420908E**
**ACCESS: Bush aircraft.**

**AREA: Northeast tip of Woosey Lake**
**AIRPHOTO: A26366-133**

EXPLORATION SUMMARY:

Granges Exploration Aktiebolag drilled four holes totalling 259 m in 1974-75 (A.F. 91847).

GEOLOGICAL SETTING:

The general area of occurrence 74 is underlain by mafic volcanic rocks flanked to the northwest and southwest by felsic intrusive rocks of the Ham Lake pluton and lesser greywacke and mudstone. The occurrence is 0.2 km southwest of the intersection of two faults. The volcanic and sedimentary rocks in the area (Fig. 74-1) have been assigned to the Amisk Group. Drill holes intersected interbedded argillite and greywacke, quartz biotite hornblende gneiss, foliated andesite, minor quartzite and quartz-feldspar porphyry (Fig. 74-1).

MINERALIZATION:

Bands of moderate to near solid pyrrhotite and pyrite about 1 m in core length are interbedded with argillite and/or quartz-biotite-hornblende gneiss in a section 2.25-8.3 m in core length. Traces of sphalerite and chalcopyrite were noted in all 4 drill holes. Several sections with up to 3% sphalerite and up to 4% chalcopyrite are present in core from DDH C-3.

GEOCHEMICAL DATA:

Assay data for Au, Ag, Cu and Zn are contained in Assessment File 91847. Higher assays values include 0.68% Cu, 0.33% Zn, 0.03 g/t Au, 0.3 g/t Ag over 0.8 m and 0.18% Cu, 0.18% Zn, 0.03 g/t Au and 0.3 g/t Ag over 4.5 m in DDH C-3.

CLASSIFICATION:

Chemical sediment-type deposit. Sulphide facies iron formation. Sulphide mineralization interbedded with a sequence of argillite and quartz-biotite-hornblende gneiss.

REFERENCES:

Assessment File 91847
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1987: Chisel-Morgan lakes; Manitoba Energy and Mines, Preliminary Map 1987S-1, 1:15 840

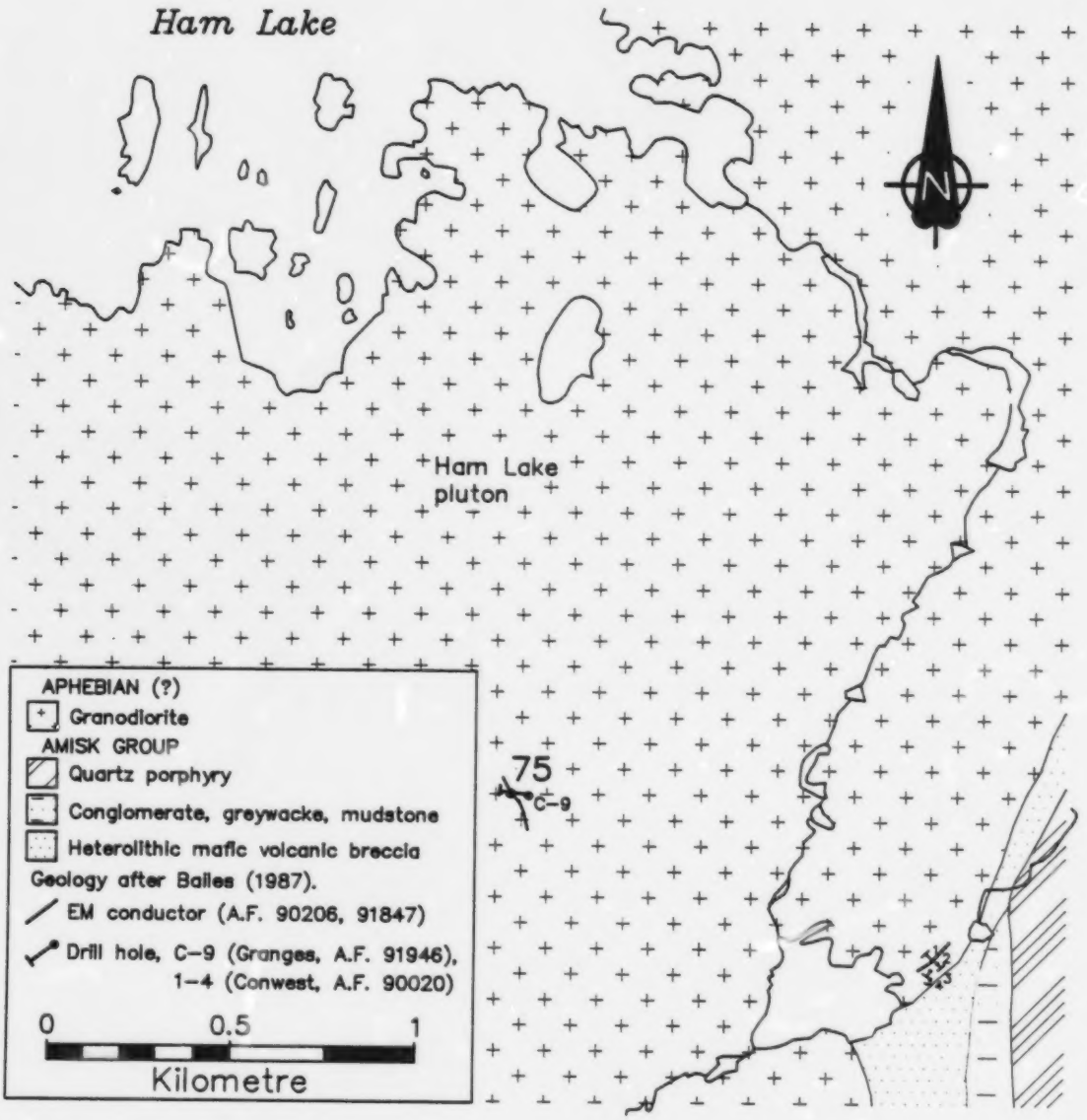



*Figure 75-1: Geological setting and drill hole locations at occurrence 75*

**LOCATION: 75**

**NAME: Mineralization intersected by diamond drilling**
**UTM: 6079174N/421518E**
**ACCESS: Bush aircraft and traverse from Ham Lake.**

**AREA: 1.3 km southeast of Ham Lake**
**AIRPHOTO: A26367-21**

EXPLORATION SUMMARY:

Conwest Exploration Company Limited conducted an EM survey and drilled four holes totalling 106 m on the DEE 2 claim in 1964 (A.F. 90020, 90206). Granges Exploration Aktiebolag conducted an EM survey in 1974 over an area that includes C.B. 4825 (A.F. 91847) and drilled one 96 m long hole in 1975 (A.F. 91946).

GEOLOGICAL SETTING:

The drill holes were collared in granodiorite, part of the extensive Ham Lake pluton (Fig. 75-1). Sections or rafts of sedimentary gneiss were observed in drill core.

MINERALIZATION

DDH C-9 intersected a graphite layer/lens 67 m in core length that contains 10-15% pyrite, 10% chalcopyrite and 5% magnetite. The holes drilled by Conwest were mostly barren with a 4.5 m section in DDH 2 containing minor disseminated pyrite with trace chalcopyrite.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment-type deposit. Graphite with minor sulphide mineralization hosted by partially assimilated sedimentary rafts in felsic intrusive rocks.

REFERENCES:

Assessment Files 90020, 90206, 91847, 91946
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1987: Chisel-Morgan lakes; Manitoba Energy and Mines, Preliminary Map, 1:15 840.

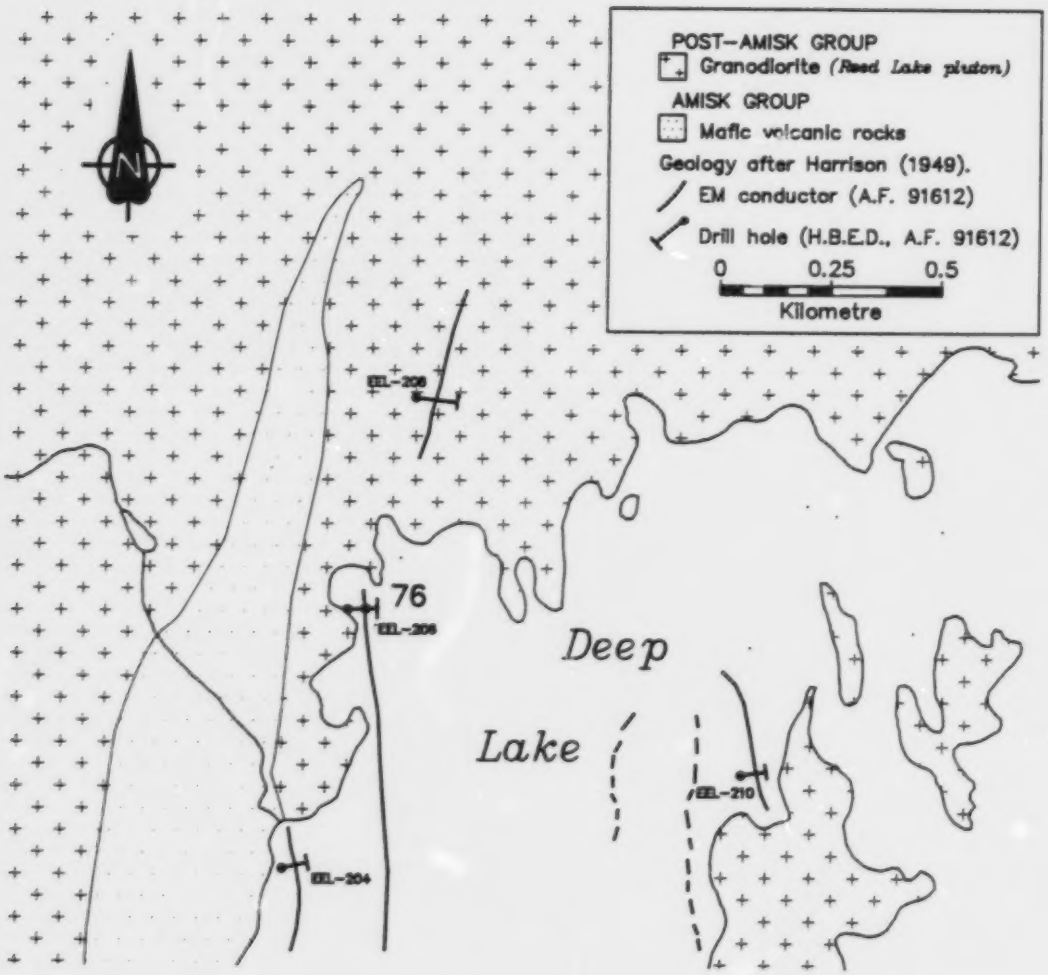



*Figure 76-1: Geological setting and drill hole locations at occurrence 76*

**LOCATION: 76**

NAME: Mineralization intersected by diamond drilling
UTM: 6068338N/410630E
ACCESS: Bush aircraft.

AREA: Northwest end of Deep Lake
AIRPHOTO: A26323-110

EXPLORATION SUMMARY:

HBED drilled four holes totalling 378 m to test EM conductors on C.B. 1482 (Eel claims) in 1973 (A.F. 91612).

GEOLOGICAL SETTING:

The general area of occurrence 76 is underlain by granodiorite of the post-Amisk Reed Lake pluton. Amisk Group mafic volcanic rocks occur approximately 100 m west of the occurrence (Fig. 76-1). At the occurrence drill holes intersected grey granodiorite and banded biotite gneiss (Fig. 76-1). The gneissic sections probably represent partially digested sedimentary xenoliths.

MINERALIZATION:

Sections of drill core ranging from less than 1 to greater than 30 m in length contain disseminated to banded graphite (2-40%), pyrrhotite (2-10%) and pyrite (trace-5%).

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment-type deposit. Graphite and Fe-sulphide minerals associated with banded gneissic sections in felsic intrusive rocks.

REFERENCES:

Assessment File 91612
Manitoba Energy and Mines, Minerals Division.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping lakes area, Manitoba; Geological Survey of Canada, Map 929A; 1:63 360.

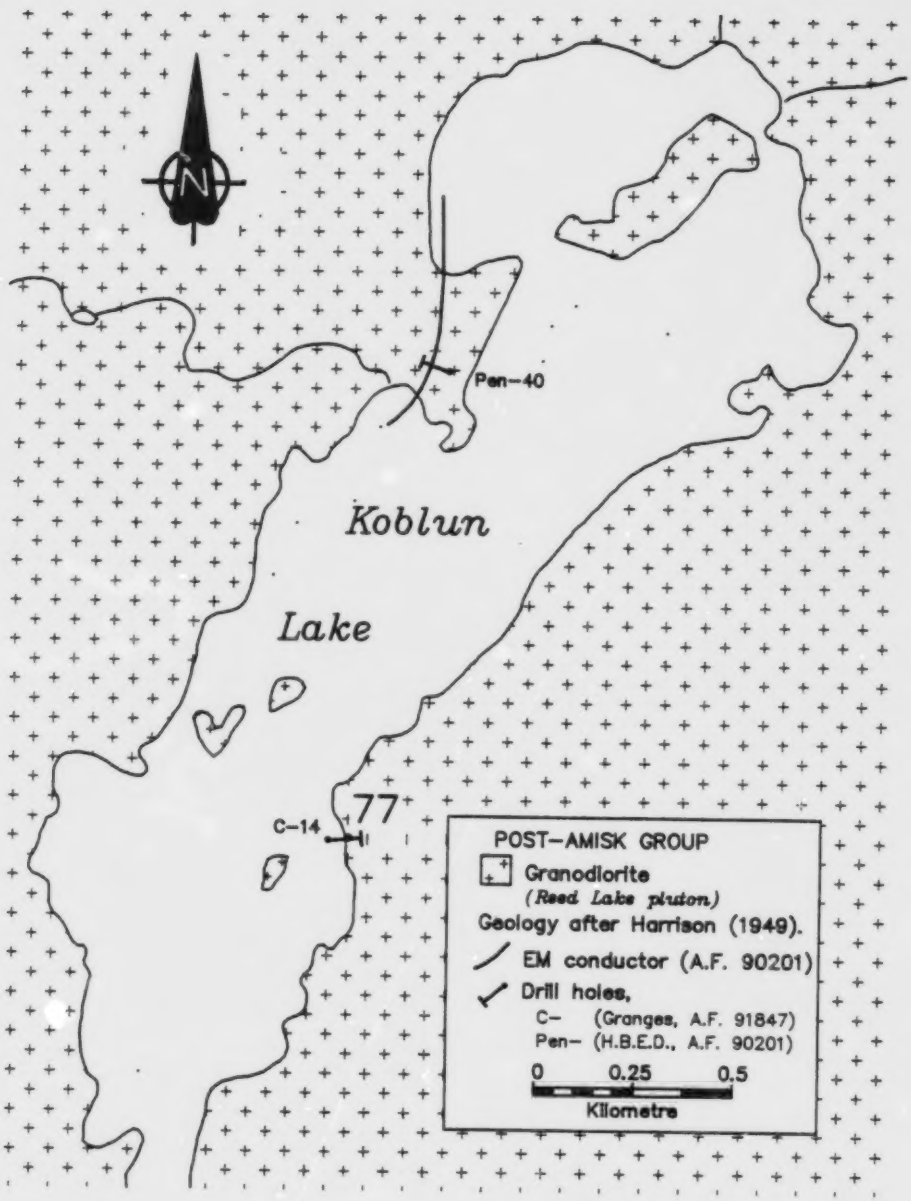



*Figure 77-1: Geological setting and drill hole locations at occurrence 77*

**LOCATION:** 77

**NAME:** Mineralization intersected by diamond drilling
**UTM:** 6068432N/414393E
**ACCESS:** Bush aircraft.

**AREA:** Eastern side of Koblun Lake
**AIRPHOTO:** A26366-101

EXPLORATION SUMMARY:

HBED drilled D.D.H. Pen-40 (59 m) to test an EM anomaly on claim Pen-125 in 1965 (A.F. 90201). Granges Exploration Aktiebolag drilled DDH C-14 (54 m) to test an EM anomaly on CB 6251 in 1974 (A.F. 91847).

GEOLOGICAL SETTING:

Diamond drill holes C-14 and Pen-40 intersected quartz-rich granite gneiss, part of the post-Amisk Reed Lake granodiorite pluton and mafic xenoliths (Fig. 77-1).

MINERALIZATION:

Near solid graphite and 2-10% pyrite are present in two sections 1.3 and 2.1 m long within mafic volcanic xenoliths in D.D.H. C-14 (A.F. 91847). D.D.H. Pen-40 contains three sections less than 1.0 m long of 80-90% graphite and 10-20% pyrite, and 2% pyrite in thin bands within mafic volcanic and/or volcaniclastic xenoliths (A.F. 90201).

GEOCHEMICAL DATA:

Assays of drill core from D.D.H. C-14 yielded only nil to trace Au, Ag, Cu and Zn.

CLASSIFICATION:

Chemical sediment-type deposit. Graphitic-sulphidic xenoliths occur within felsic intrusive rocks.

REFERENCES:

Assessment File 90201, 91847
Manitoba Energy and Mines, Minerals Division.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping lakes area, Manitoba; Geological Survey of Canada, Map 929A; 1:63 360.

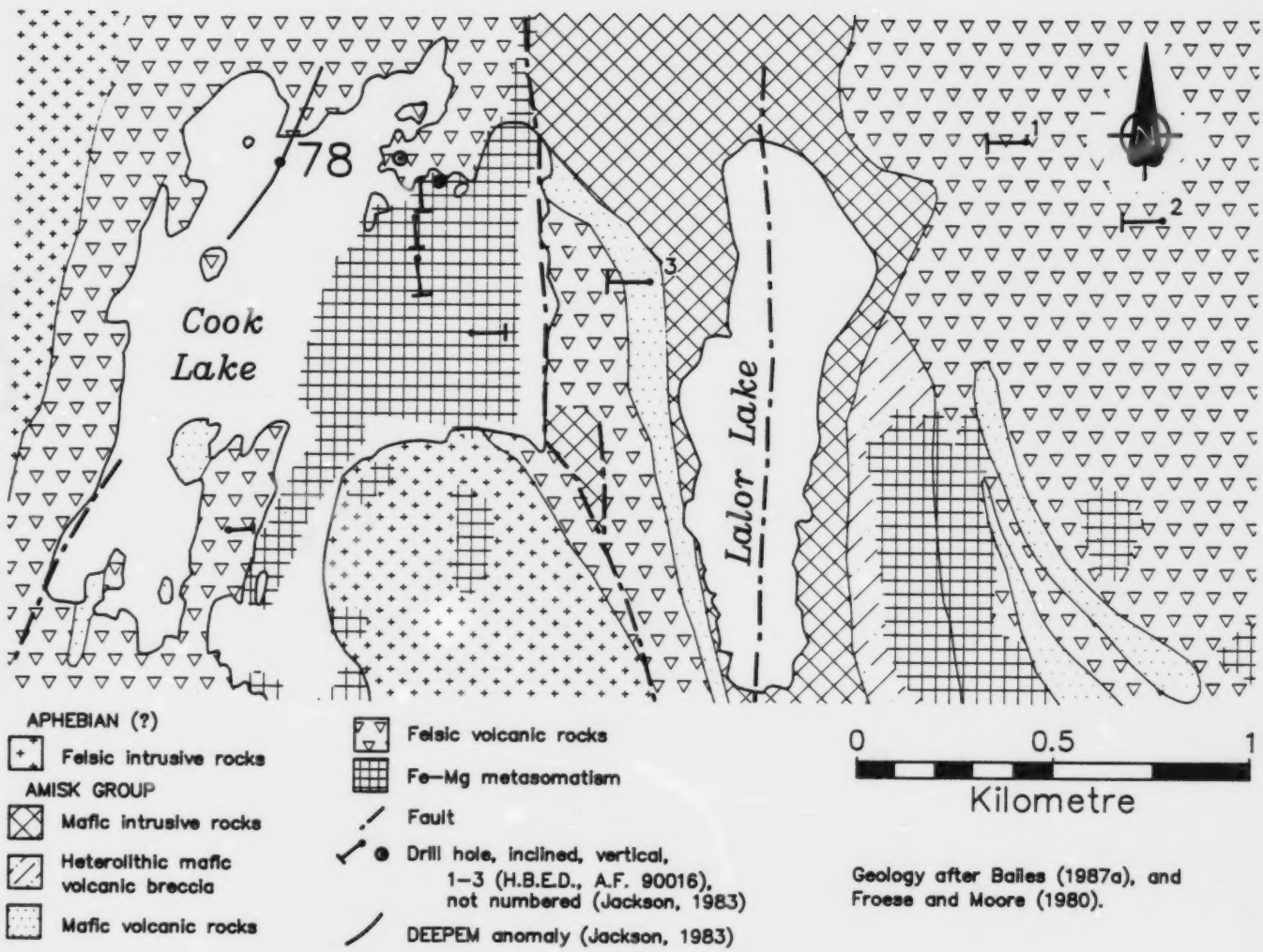



*Figure 78-1: Geological setting and drill hole locations at occurrence 78*

**LOCATION: 78**

NAME: NORTH COOK
UTM: 6081982N/424517E
ACCESS: Bush aircraft.

AREA: North end of Cook Lake
AIRPHOTO: A26366-151

EXPLORATION SUMMARY:

HBED drilled three holes totalling 431 m on the Ox claims in 1956 (A.F. 90016). Falconbridge Limited, the current owner, staked the ground in 1968 and have conducted additional diamond drilling in the area.

Diamond drilling east of Cook Lake intersected minor pyrite associated with thin graphitic layers in felsic gneiss (A.F. 90016).

GEOLOGICAL SETTING:

Amisk Group quartz- and plagioclase-phyric and aphyric felsic volcanic breccia are the major lithologies in the Cook Lake area (Bailes, 1987b) (Fig. 78-1). Five major stratigraphic subdivisions have been described by Jackson (1983) in this area. These subdivisions consist of felsic and mafic volcanic flows and fragmental rocks (see Occurrence 24 "Cook Lake - Bomber Zone"). The host rocks to the mineralized and altered zones at occurrence 78 are felsic volcaniclastic rocks. Bailes (1987b) notes similarities between the stratigraphic succession that hosts the north Cook Lake occurrence and the rock units north of Chisel lake.

MINERALIZATION:

The north Cook Lake occurrence comprises a series of stacked, boudinaged solid sulphide lenses containing up to 95% sulphide minerals. This mineralization was intersected by diamond drilling undertaken to test a DEEP EM geophysical anomaly. The solid sulphide lenses are contained within a north plunging alteration zone characterized by a predominance of alumina-silicate minerals.

Pyrrhotite and pyrite in equal proportions are the dominant sulphides. Lesser chalcopyrite and sphalerite are also present. Euhedral magnetite pseudomorphs after pyrite are common. Locally, a vuggy texture is developed in the sulphides. The vugs are often filled with a fine grained brown material that may be iron oxide minerals. Metal zonation in the solid sulphide lenses is inconsistent. Some lenses have a Cu-rich core with Zn-rich margins whereas others have a Zn-rich base with a Cu-rich top.

GEOCHEMICAL DATA:

Sections of the solid sulphide lenses contain greater than 1% Cu. Jackson (1983) presents detailed geochemical analyses of rocks throughout the Cook Lake stratigraphic sequence and its associated mineralization.

CLASSIFICATION:

Stratabound massive sulphide-type deposit in altered felsic volcanic rocks. Jackson (1983) discusses the possibility that the exhalites were at least partly reworked.

REFERENCES:


Assessment File 90016
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1987a: Chisel-Morgan lakes; Manitoba Energy and Mines, Preliminary Map 1987S-1, 1:15 840.

Bailes, A.H.
1987b: Chisel-Morgan lakes project; in Manitoba Energy and Mines, Report of Field Activities 1987, p. 71-79.

Froese, E. and Moore, J.M.
1980: Metamorphism in the Snow Lake area, Manitoba; Geological Survey of Canada, Paper 78-27, 16 p.

Jackson, A.R.
1983: Volcanism and genesis of Cu-Zn mineralization at Cook Lake, Snow Lake greenstone belt, Manitoba; M.Sc. thesis (unpublished), University of Western Ontario, 155 p.

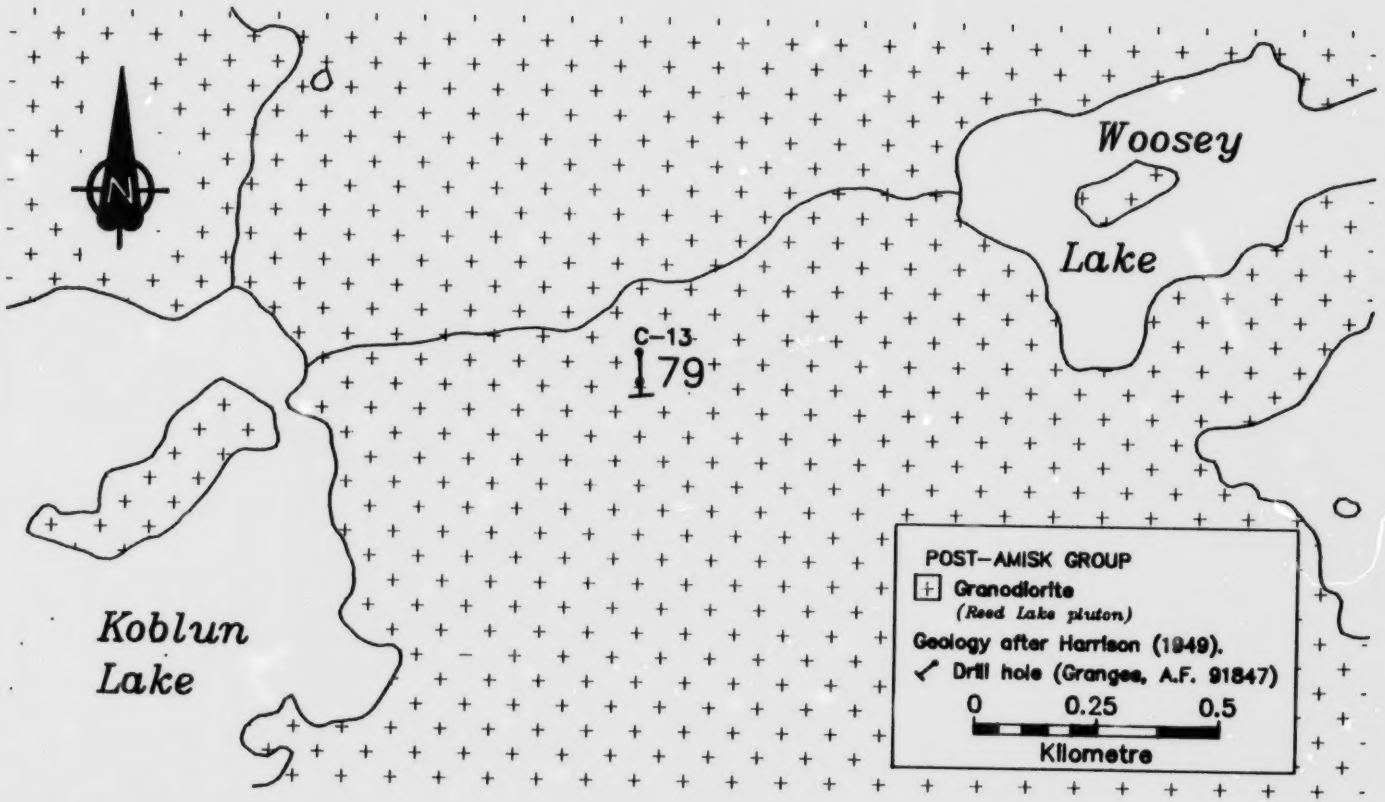



*Figure 79-1: Geological setting and drill hole location at occurrence 79*

**LOCATION:** 79

**NAME:** Mineralization intersected by diamond drilling
**UTM:** 6070346N/416169E
**ACCESS:** Bush aircraft and traverse.

**AREA:** Northeast of Koblun Lake
**AIRPHOTO:** A26366-101

**EXPLORATION SUMMARY:**

Granges Exploration Aktiebolag drilled DDH C-13 (52 m) to test an EM anomaly on CB 5622 in 1974 (A.F. 91847).

**GEOLOGICAL SETTING:**

Diamond drill hole C-13 intersected quartz granite gneiss, part of the post-Amisk Reed Lake granodiorite pluton (Fig. 79-1).

**MINERALIZATION:**

Narrow near solid bands of 20-50% pyrrhotite and 5-10% pyrite occur within a section of drillcore about 4 m long that intersected mafic volcanic xenoliths.

**GEOCHEMICAL DATA:**

Assays of drillcore yielded only trace amounts of Au, Ag, Cu and Zn.

**CLASSIFICATION:**

Chemical sediment type deposit; sulphide facies iron formation. Sulphide-bearing xenoliths occur within felsic intrusive rocks.

**REFERENCES:**

Assessment File 91847
Manitoba Energy and Mines, Minerals Division.

Harrison, J.M.
1949: Geology and mineral deposits of File-Tramping Lakes area, Manitoba; Geological Survey of Canada, Map 929A, 1:63 360.

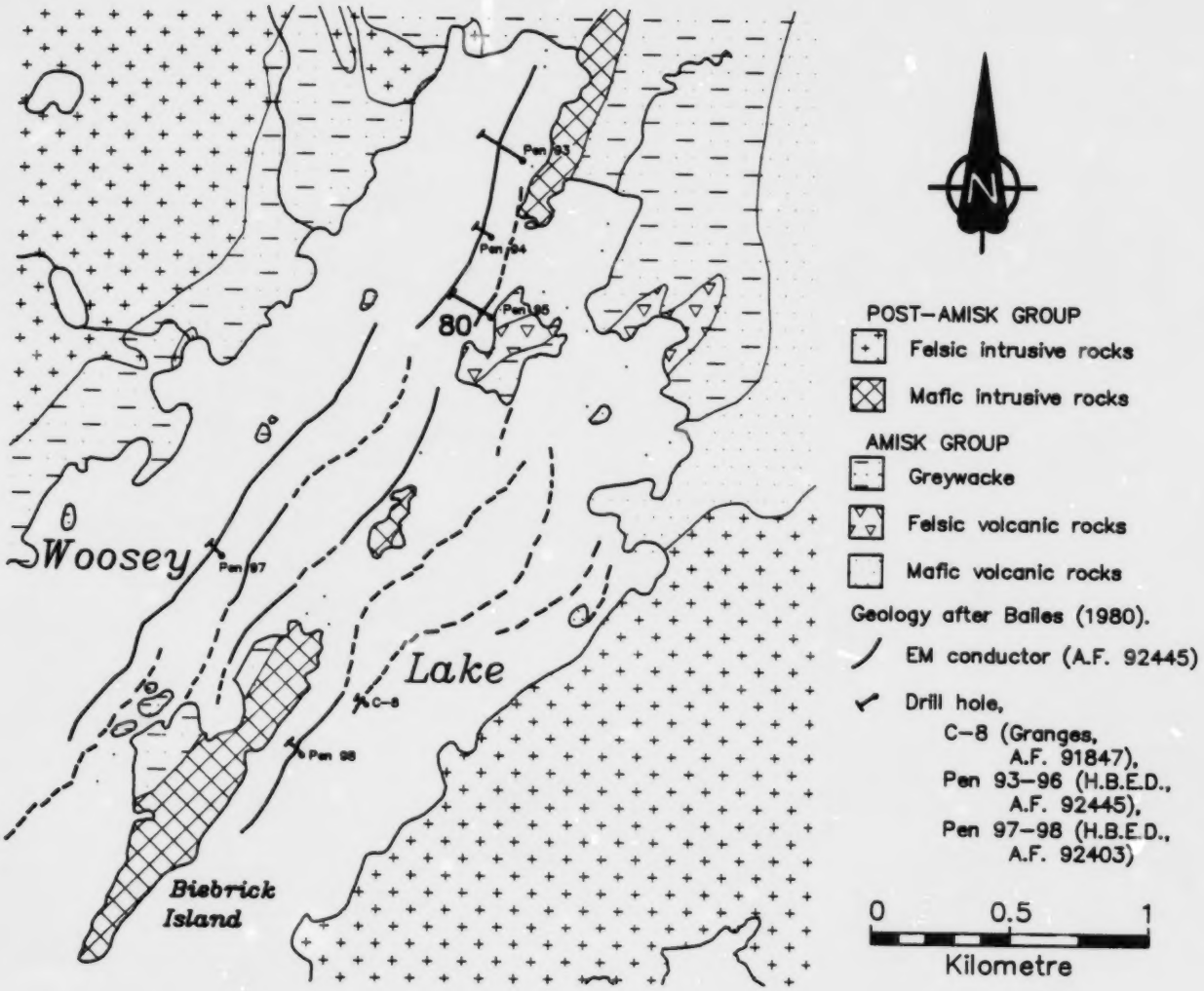



*Figure 80-1: Geological setting and drill hole locations at occurrence 80*

**LOCATION: 80**

**NAME: Mineralization intersected by diamond drilling**
**UTM: 6075398N/418750E**
**ACCESS: Bush aircraft.**

**AREA: North Woosey Lake**
**AIRPHOTO: A26366-134**

EXPLORATION SUMMARY:

Granges Exploration Aktiebolag drilled one hole (C-8, 76 m) on CB 4826 in 1975 (A.F. 91847). HBED drilled three holes totalling 598 m in 1975 (A.F. 92445) and two holes totalling 227 m 1979 (A.F. 92403) to test EM anomalies located on the Pen claims in a 1978 survey (A.F. 92404).

GEOLOGICAL SETTING:

The general area of the occurrence is underlain by quartz-phyric felsic volcanic gneiss and garnetiferous metaconglomerate. Both units have been assigned to the Amisk Group. These rocks have been intruded by various phases of the composite Josland lake gabbroic intrusion. Drill holes Pen 93-95 intersected rhyolitic to dacitic volcanic rocks, lesser biotite-hornblende gneiss and graphite schist. Drill holes C-8, Pen-97 and Pen-98 intersected argillaceous sedimentary rocks. The locations of drill holes are shown in Figure 80-1.

MINERALIZATION:

Minor disseminations to near solid sections of graphite and/or pyrrhotite-pyrite are common in DDHs Pen 93-95. Pen 95 contains traces of chalcopyrite and sphalerite. Pen 97 is graphitic, but no sulphide mineralization was noted in drill logs. C-8 and Pen 98 contained neither graphite nor sulphide mineralization.

GEOCHEMICAL DATA:

No significant assay values were obtained from any reported drillcore samples.

CLASSIFICATION:

Chemical sediment-type deposit. Graphite and/or iron sulphide mineralization occurs in minor to near solid sulphide bands in felsic volcanic rocks and argillite.

REFERENCES:

Assessment File 91847, 92403, 92404, 92445
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

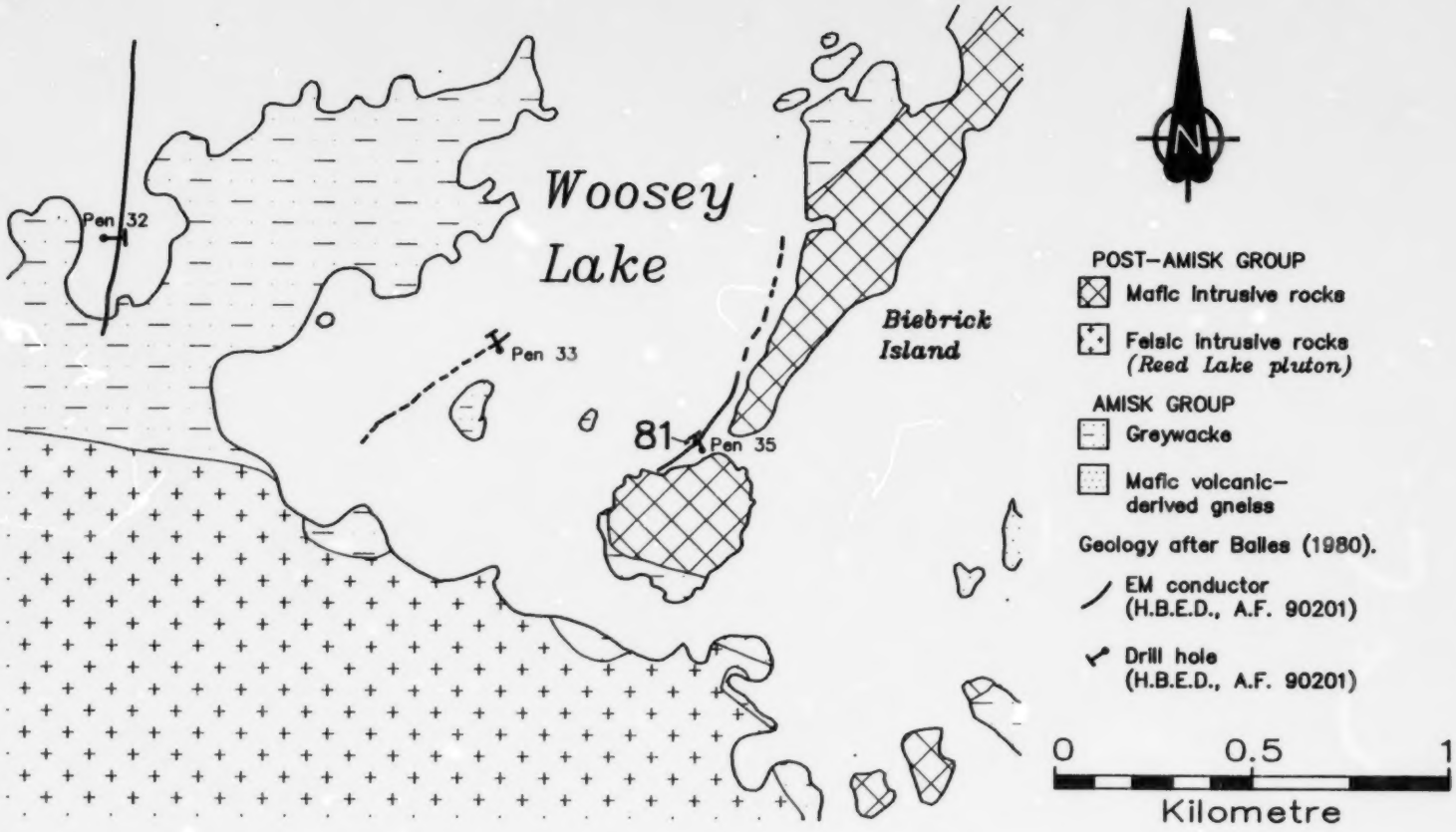



*Figure 81-1: Geological setting and drill hole locations at occurrence 81*

**LOCATION: 81**

**NAME: Mineralization intersected by diamond drilling**
**UTM: 6072933N/417239E**
**ACCESS: Bush aircraft.**

**AREA: West Woosey Lake**
**AIRPHOTO: A26367-40**

EXPLORATION SUMMARY:

HBED drilled three holes totalling 233 m on the Pen claims in 1965 (A.F. 90201).

GEOLOGICAL SETTING:

The general area of occurrence 81 is underlain by Amisk group grey garnetiferous biotite ± staurolite ± sillimanite gneiss. These rocks have been intruded by the composite Josland Lake gabbroic intrusion (Fig. 81-1). Drill holes Pen 32 and 33 intersected quartz + biotite + garnet ± chlorite ± staurolite gneiss of sedimentary origin with relict quartz pebbles and boulders (Fig. 81-1). Pen 35 was collared in diorite but intersected altered mafic sedimentary rocks containing minor zones of quartz and biotite.

MINERALIZATION:

Drill logs record core lengths up to 31 m containing 40-80% graphite and 5-20% pyrite. Mineralization in Pen 32 is less abundant with 5-10% graphite and 5-10% pyrite in a section 4.5 m in core length.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment-type deposit. Near solid graphite and pyrite occur in sedimentary gneiss.

REFERENCES:

Assessment File 90201
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

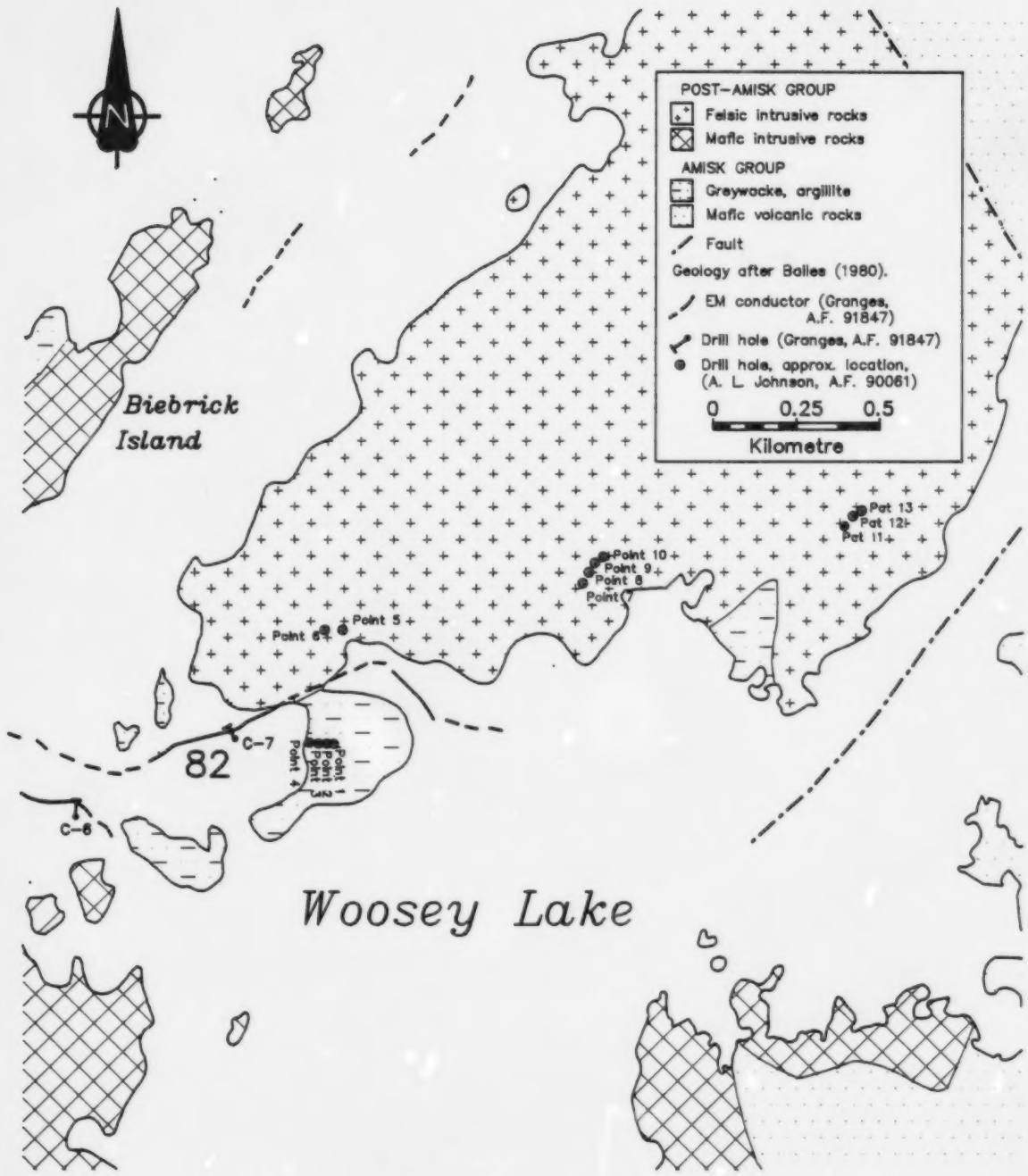



*Figure 82-1: Geological setting and drill hole locations at occurrence 82*

**LOCATION:** 82

**NAME:** Mineralization intersected by diamond drilling
**UTM:** 6072558N/418315E
**ACCESS:** Bush aircraft.

**AREA:** Northeast Woosey Lake
**AIRPHOTO:** A26366-133

EXPLORATION SUMMARY:

A.L. Johnson drilled 13 holes totalling 119 m in 1957 (A.F. 90061). Granges Exploration Aktiebolag drilled two holes, C-6 and C-7, totalling 117 m to test geophysical anomalies on CB 5617 in 1975 (A.F. 91847).

GEOLOGICAL SETTING:

The general area of occurrence 82 is underlain by Amisk group grey garnetiferous biotite ± staurolite ± sillimanite gneiss. These rocks have been intruded by the composite Josland Lake gabbroic intrusion and granodiorite. Drill holes in the area intersected interbedded greywacke, argillite, arkose, and quartz-biotite-hornblende paragneiss (Fig. 82-1).

MINERALIZATION:

DDH C-7 intersected 26 m (core length) of near solid graphite, 10-15% pyrite and 10-15% magnetite. Mineralization in DDH C-6 is similar but less extensive. The Point drill holes contained numerous sections 0.6-2 m in core length with minor pyrite and rare sphalerite and chalcopyrite.

GEOCHEMICAL DATA:

One sample from DDH C-7 contained 0.41% Zn over 25 feet. Other assay results from the Granges drill holes were not significant. There are no data for the Point drill holes.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation. Near solid graphitic and sulphidic sections occur within interbedded greywacke and argillite.

REFERENCES:

Assessment Files 90061, 91847
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

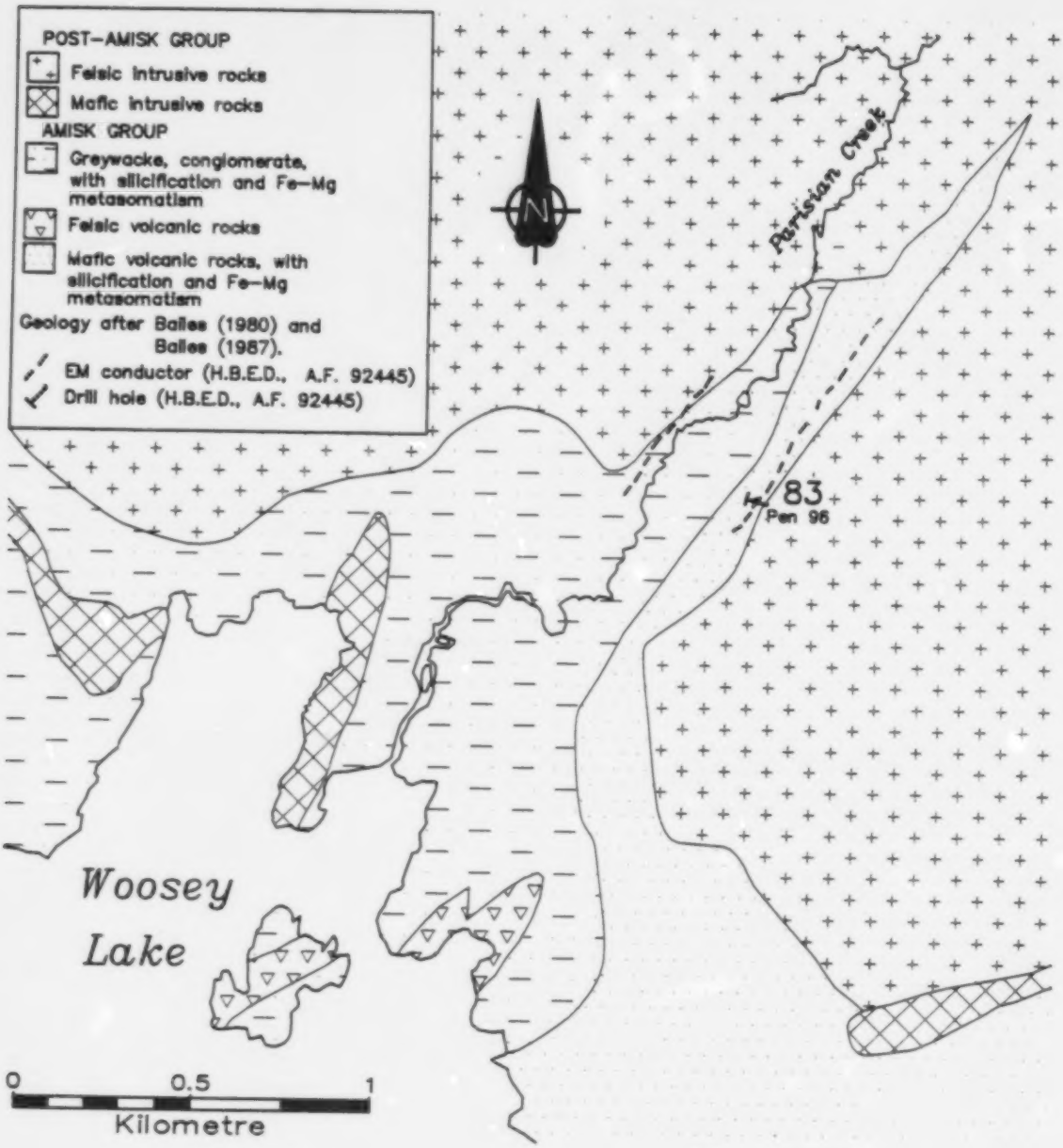



*Figure 83-1: Geological setting and drill hole location at occurrence 83*

**LOCATION: 83**

**NAME: Mineralization intersected by diamond drilling**
**UTM: 6076607N/420267E**
**ACCESS: Bush aircraft and traverse.**

**AREA: 1 km northeast of Woosey Lake**
**AIRPHOTO: A26366-135**

EXPLORATION SUMMARY:

HBED drilled DDH Pen 96 (82 m) in 1975 to test an EM anomaly on CB 3005 (A.F. 92445).

GEOLOGICAL SETTING:

The general area of occurrence 83 is underlain by locally silicified and Fe-Mg metasomatized mafic volcanic rocks. These rocks are flanked to the east by post-Amisk Group felsic intrusive rocks and to the west by locally silicified greywacke. The mafic volcanic rocks and the greywacke have been assigned to the Amisk Group. At the occurrence drill logs note that DDH Pen 96 intersected rhyolitic to dacitic volcanic rocks, biotite gneiss, and diorite (Fig. 83-1).

MINERALIZATION:

Trace to minor pyrite disseminated in dacite, biotite gneiss, and diorite.

GEOCHEMICAL DATA:

"No significant assay values were obtained" (A.F. 92445).

CLASSIFICATION:

Disseminated mineralization - not classified. Trace pyrite is disseminated in felsic volcanic rocks and sedimentary-derived gneissic rocks.

REFERENCES:

Assessment File 92445
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1987: Chisel-Morgan lakes; Manitoba Energy and Mines, Preliminary Map 1987S-1, 1:15\840.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Department of Energy and Mines, Mineral Resources Division, Geological Report 78-1, 134 p.

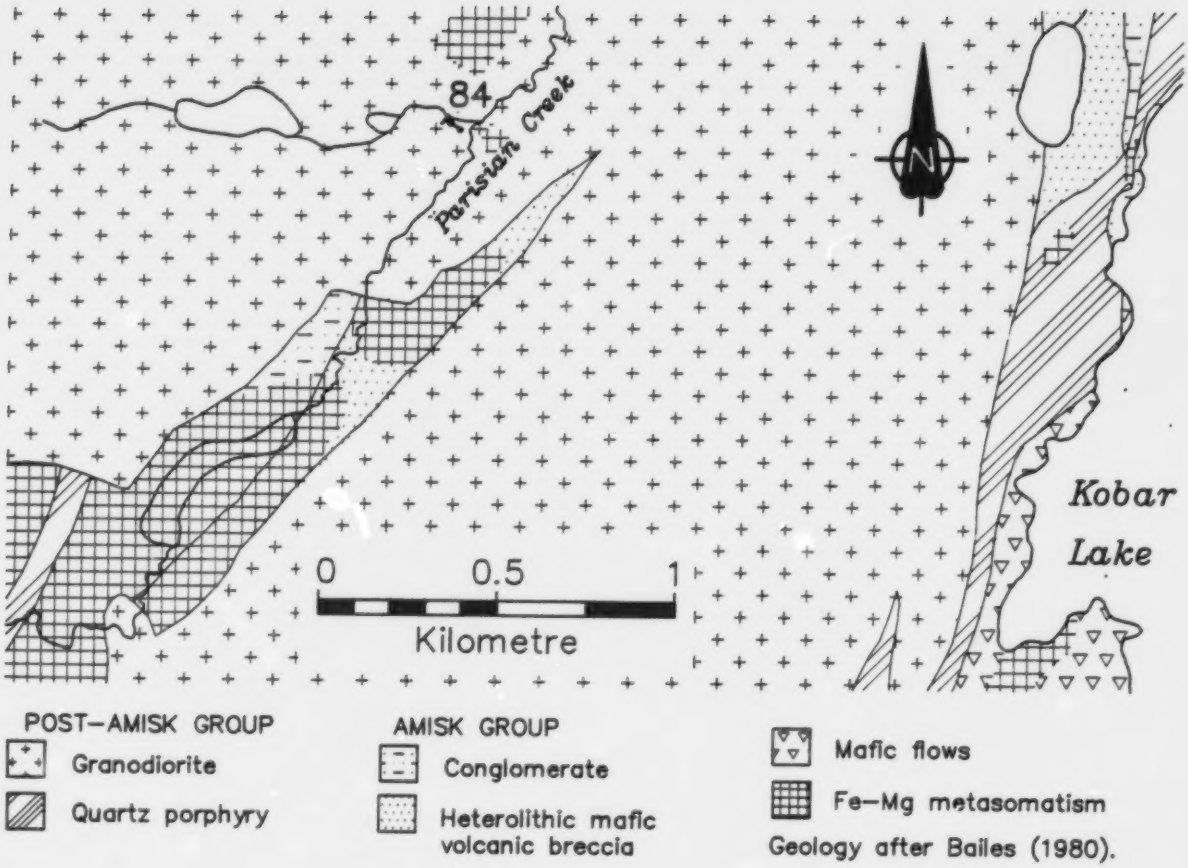



*Figure 84-1: Geological setting and drill hole location at occurrence 84*

**LOCATION: 84**

**NAME: Mineralization intersected by diamond drilling**
**UTM: 6077692N/420810E**
**ACCESS: Bush aircraft and traverse.**

**AREA: 2 km west of north Kobar Lake**
**AIRPHOTO: A26366-136**

EXPLORATION SUMMARY:

HBED drilled DDH Don-1 (76 m) on claim Don 2 in 1975 (A.F. 92243).

GEOLOGICAL SETTING:

The general area of occurrence 84 is underlain by granodiorite. A wedge of Fe-Mg altered heterolithic mafic volcanic breccia and conglomerate of the Amisk Group occurs approximately 0.5 km south of the occurrence (Fig. 84-1). At the occurrence DDH Don-1 intersected granodiorite with lesser diorite, garnet-biotite gneiss, dacite tuff and porphyry, and minor chlorite-sericite schist (Fig. 84-1).

MINERALIZATION:

Drill logs note trace to 3% pyrite and traces of chalcopyrite in diorite, garnet-biotite gneiss and dacite porphyry.

GEOCHEMICAL DATA:

Assays of core for Au, Ag, Cu, and Zn were low.

CLASSIFICATION:

Disseminated mineralization - not classified. Minor pyrite is disseminated in diorite dykes and apparently in volcanic and sedimentary xenoliths.

REFERENCES:

Assessment File 92243
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1987: Chisel-Morgan lakes; Manitoba Energy and Mines, Preliminary Map 1987S-1, 1:15 840.

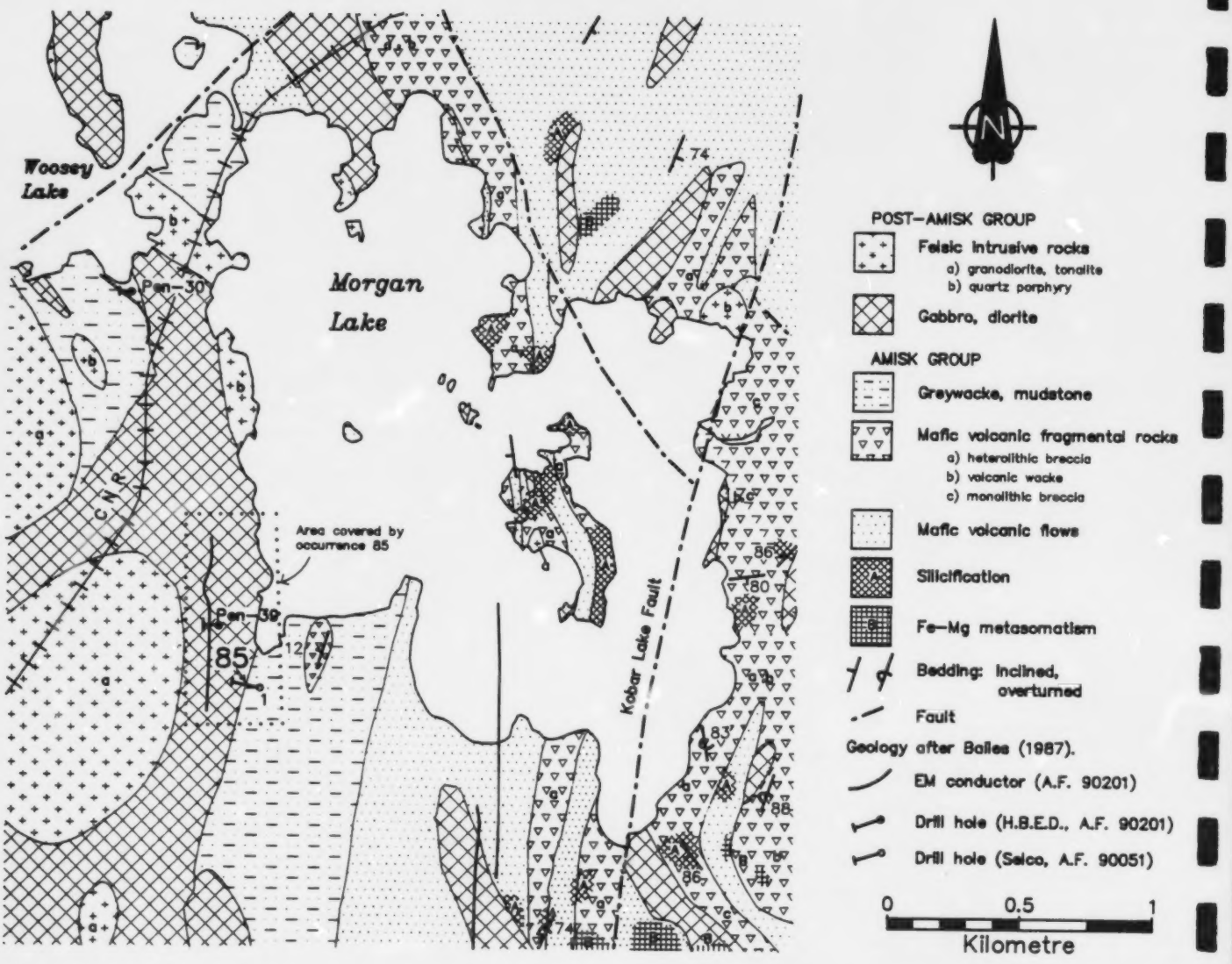



*Figure 85-1: Geological setting of occurrence 85*

**LOCATION: 85**

**NAME: Mineralization intersected by diamond drilling**
**UTM: 6068519N/420477E**
**ACCESS: Bush aircraft, winter drill roads.**

**AREA: Southwest shore of Morgan Lake**
**AIRPHOTO: A26367-14**

EXPLORATION SUMMARY:

Selco Exploration Company Limited drilled one hole (DDH 1) to a depth of 176 m on claim Ben 30 in 1958 (A.F. 90051). HBED drilled one hole (Pen 39) to a depth of 80 m to test an EM conductor on claim Pen 30 in 1965 (A.F. 90201). The ground is presently covered by the Mor claims staked by W. Bruce Dunlop Limited in 1971. Interests were transferred to Granges Exploration Limited in 1987.

GEOLOGICAL SETTING:

The general area of occurrence 85 is underlain by a sequence of greywacke and mudstone that abuts post-Amisk Group gabbro and diorite to the west. Mafic volcanic flows occur to the east of the host rocks. The greywacke, mudstone and mafic volcanic rocks have been assigned to the Amisk Group. At the occurrence drill holes intersected banded quartz-biotite ± carbonate ± chlorite ± garnet ± staurolite gneiss of probable volcanic origin (Fig. 85-1). The gneiss is intruded by diorite and hornblende gabbro.

MINERALIZATION:

Sections of drillcore up to 11.5 m long contain 10-40% graphite and 10-60% pyrrhotite in banded argillite and gneiss. DDH 1 intersected a 36.9 m section of rhyolite to andesite with a 10-25% fine grained disseminated and stringer pyrite (A.F 90051).

GEOCHEMICAL DATA:

Two drillcore assays from DDH 1 returned nil Au over 3 ft. sections (A.F. 90051).

CLASSIFICATION:

Chemical sediment-type deposit consisting of graphite and pyrrhotite hosted by siliceous intermediate volcanic gneiss. A second mineral deposit type, disseminated mineralization - not classified, is present at this occurrence. Disseminated and stringer pyrite occurs in felsic to intermediate volcanic rocks.

REFERENCES:

Assessment Files 90051, 90201
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1987: Chisel-Morgan lakes; Manitoba Energy and Mines, Preliminary Map 1987S-1, 1:15 840.

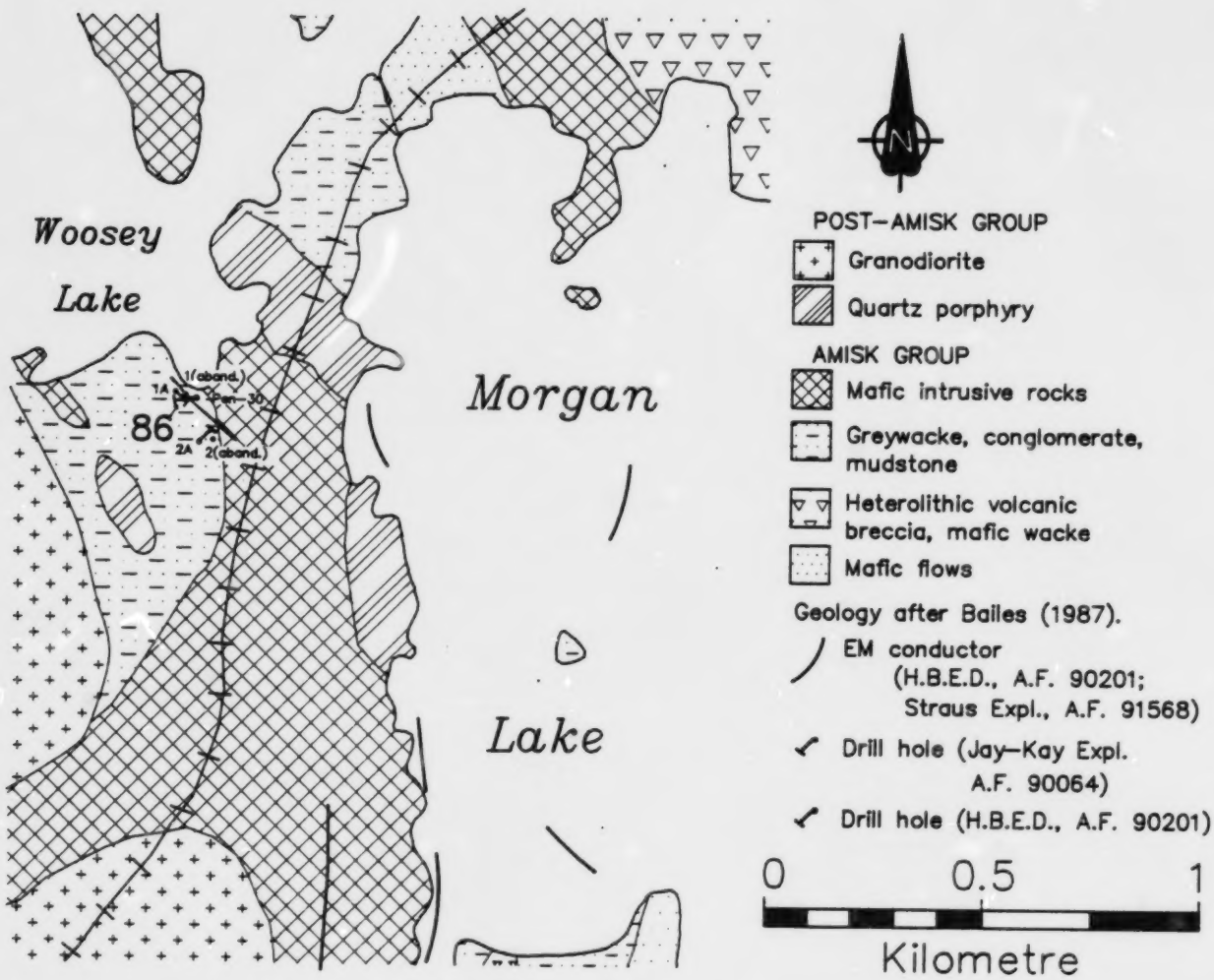



*Figure 86-1: Geological setting and drill hole locations at occurrence 86*

**LOCATION: 86**

**NAME: Mineralization intersected by diamond drilling**
**UTM: 6069952N/420040E**
**ACCESS: Bush aircraft or winter drill roads to Morgan Lake.**

**AREA: Southeast side of Woosey Lake**
**AIRPHOTO: A26366-130**

EXPLORATION SUMMARY:

Jay-Kay Exploration Syndicate drilled four holes (two were abandoned in overburden) totalling 138 m on claims File-9 and File-4 in 1954 (A.F. 90064). HBED drilled one hole (Pen 30) 126 m long to test a geophysical conductor on claim Pen 23 in 1965 (A.F. 90201). Straus Exploration completed magnetic and EM surveys on the Car claims in 1972 (A.F. 91568).

GEOLOGICAL SETTING:

The general area of occurrence 86 is underlain by Amisk Group greywacke, conglomerate and mudstone. These rocks are flanked to the west by granodiorite and to the east by mafic intrusive rocks (Fig. 86-1). The intrusions are of post-Amisk Group age. At the occurrence drill holes 1A and 2A intersected greywacke, conglomerate and banded argillite (A.F. 90064). DDH Pen 39 contained quartz - biotite ± carbonate ± garnet gneiss and minor diorite sections. Drill hole locations are shown in Figure 86-1.

MINERALIZATION:

Zones up to 12.0 m in core length that contain 40-60% graphite, 10-60% pyrrhotite and 2-5% pyrite in quartz-biotite gneiss were intersected in DDH Pen 30 (A.F. 90201). Pyrite is also associated to a lesser extent with greywacke and conglomerate sections.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation. Graphitic sulphide and banded argillite.

REFERENCES:

Assessment Files 90064, 90201, 91568
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1987: Chisel-Morgan lakes; Manitoba Energy and Mines, Preliminary Map 1987S-1, 1:15 840.

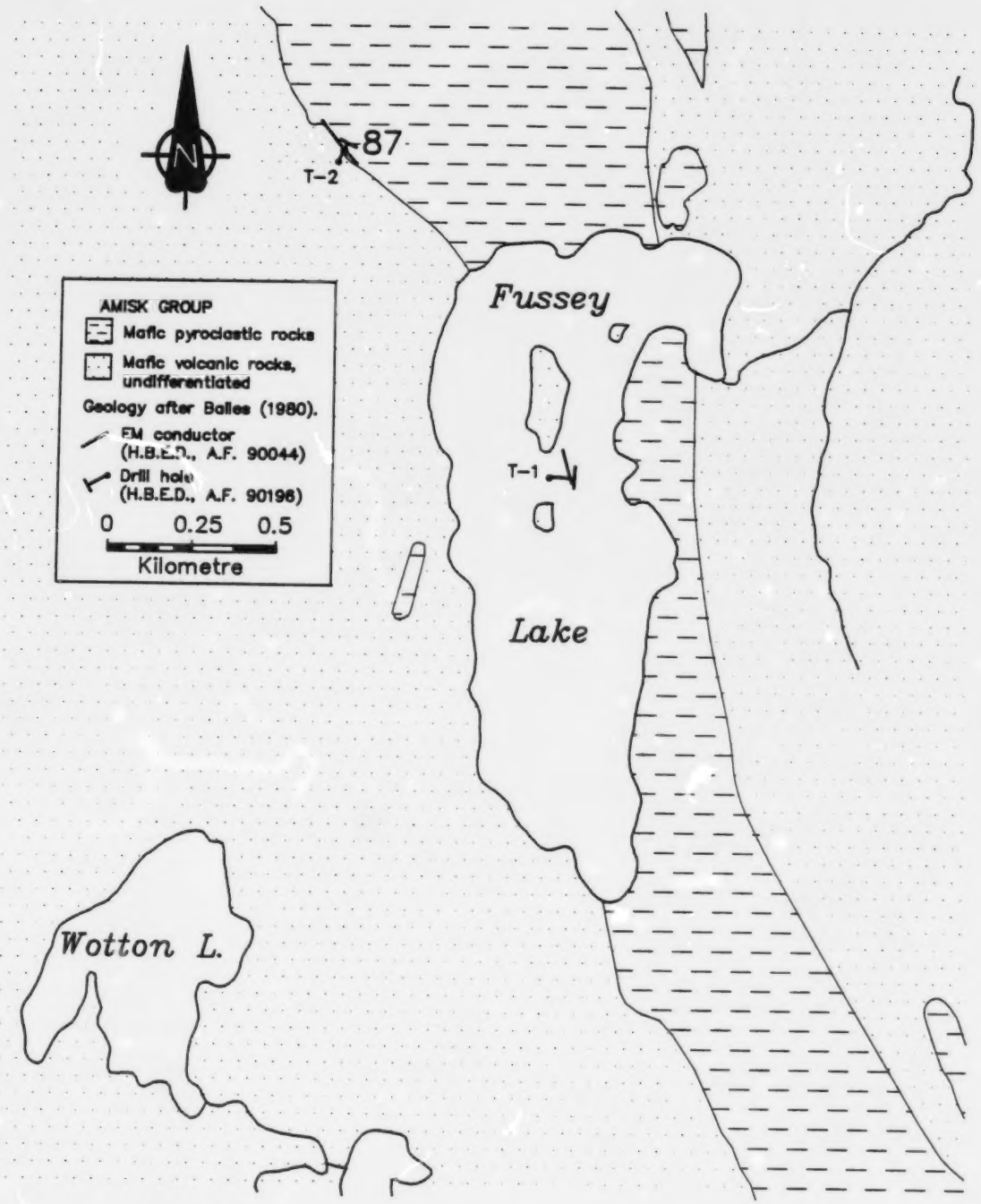



*Figure 87-1: Geological setting of occurrence 87*

**LOCATION: 87**

**NAME: Mineralization intersected by diamond drilling**
**UTM: 607646N/411646E**
**ACCESS: Bush aircraft.**

**AREA: 0.5 km northwest of Fussey Lake**
**AIRPHOTO: A26367-125**

EXPLORATION SUMMARY:

In 1958 HBED drilled two holes, T-1 and T-2, totalling 173 m to test EM anomalies on claims Toe-64 and Toe-38, respectively (A.F. 90034, 90044, 90196).

GEOLOGICAL SETTING:

The general area of mineral occurrence 87 is underlain by undifferentiated mafic volcanic rocks flanked to the east by mafic pyroclastic rocks (Fig. 87-1). Both units have been assigned to the Amisk Group. At the occurrence drill holes T-1 and T-2 intersected mafic volcanic rocks, including tuff and porphyritic flows and mafic intrusive rocks (Fig. 87-1).

MINERALIZATION:

DDH T-2 contained a 14 m long section of banded siliceous graphitic, biotitic, sericitic schistose rock in a shear zone in contact with mafic intrusive rock. Minor to moderate pyrite and pyrrhotite, and rare chalcopyrite and sphalerite occur as disseminations and in small stringers throughout the schist. Trace to minor pyrite and pyrrhotite and rare chalcopyrite and sphalerite form streaks and stringers throughout the core from both holes.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation. Sheared, banded, siliceous graphitic schist with Fe-sulphides and lesser chalcopyrite and sphalerite.

REFERENCES:

Assessment Files 90034, 90044, 90196
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

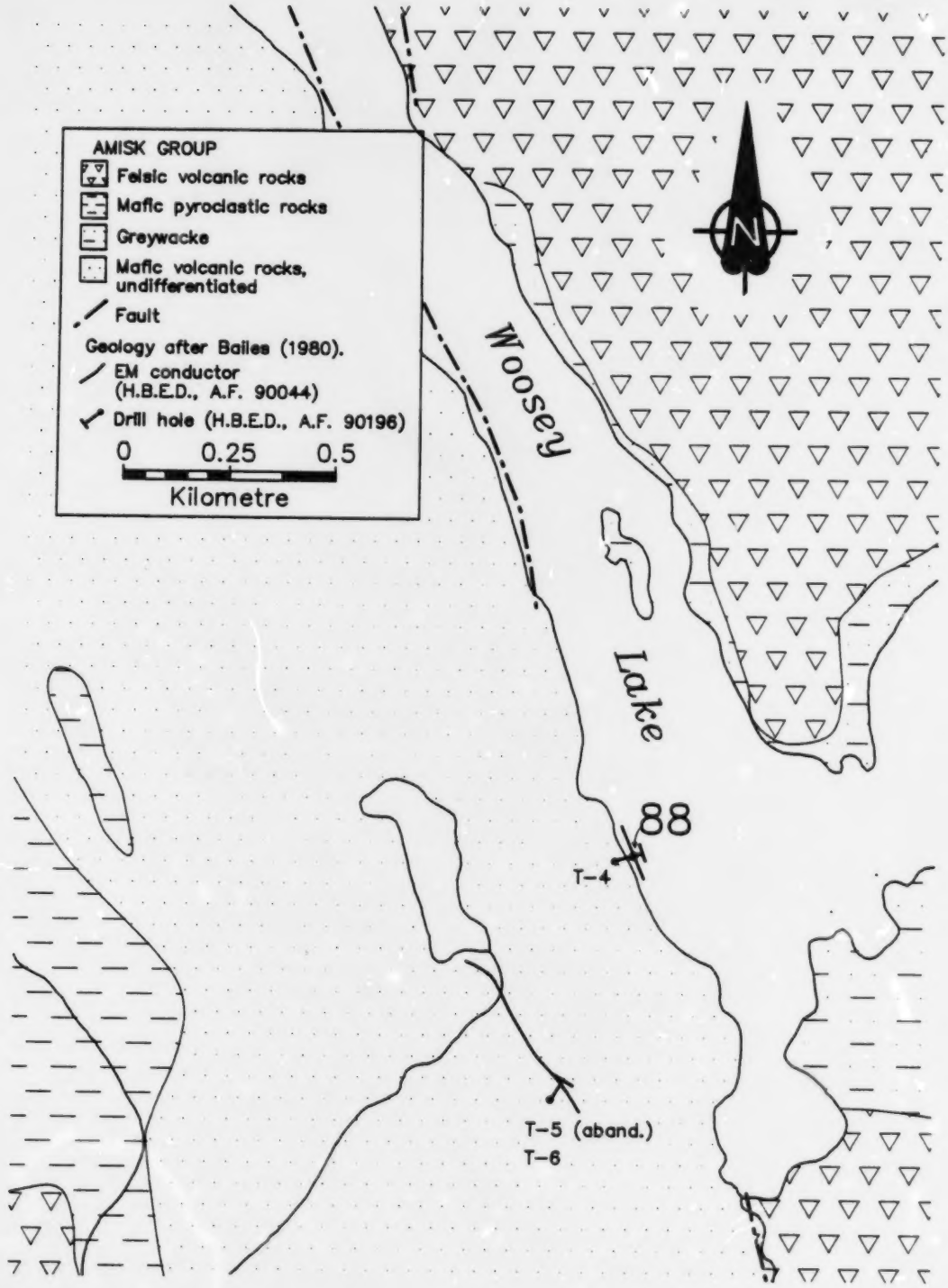



*Figure 88-1: Geological setting of occurrence 88*

**LOCATION: 88**

**NAME: Mineralization intersected by diamond drilling**
**UTM: 6073576N/414872E**
**ACCESS: Bush aircraft.**

**AREA: West shore of northwest arm of Woosey Lake**
**AIRPHOTO: A26366-101**

EXPLORATION SUMMARY:

HBED drilled three holes, T-4, T-5 and T-6, totalling 157 m to test EM anomalies on claims Tac-1 and Toe-109 in 1959 (A.F. 90034, 90044, 90196, 92522).

GEOLOGICAL SETTING:

The general area of occurrence 88 is underlain by undifferentiated mafic volcanic rocks flanked to the west by mafic pyroclastic and felsic volcanic rocks and to the east by felsic volcanic rocks and lesser greywacke (Fig. 88-1). These rock units have been assigned to the Amisk Group. At the occurrence drill holes T-4 and T-6 intersected locally banded and silicified mafic volcanic rocks and minor mafic intrusive rocks (Fig. 88-1).

MINERALIZATION:

DDH T-4 intersected a 22.6 m long section of sheared banded mafic rocks containing graphite and narrow stringers of pyrite and pyrrhotite that parallel banding. In addition, minor disseminated pyrite, rare chalcopyrite and rare to minor quartz-carbonate stringers are nearly ubiquitous throughout drill core from both holes.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation. Strongly foliated banded siliceous graphitic schist with iron sulphides and minor quartz and carbonate.

REFERENCES:

Assessment Files 90034, 90044, 90196, 92522
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

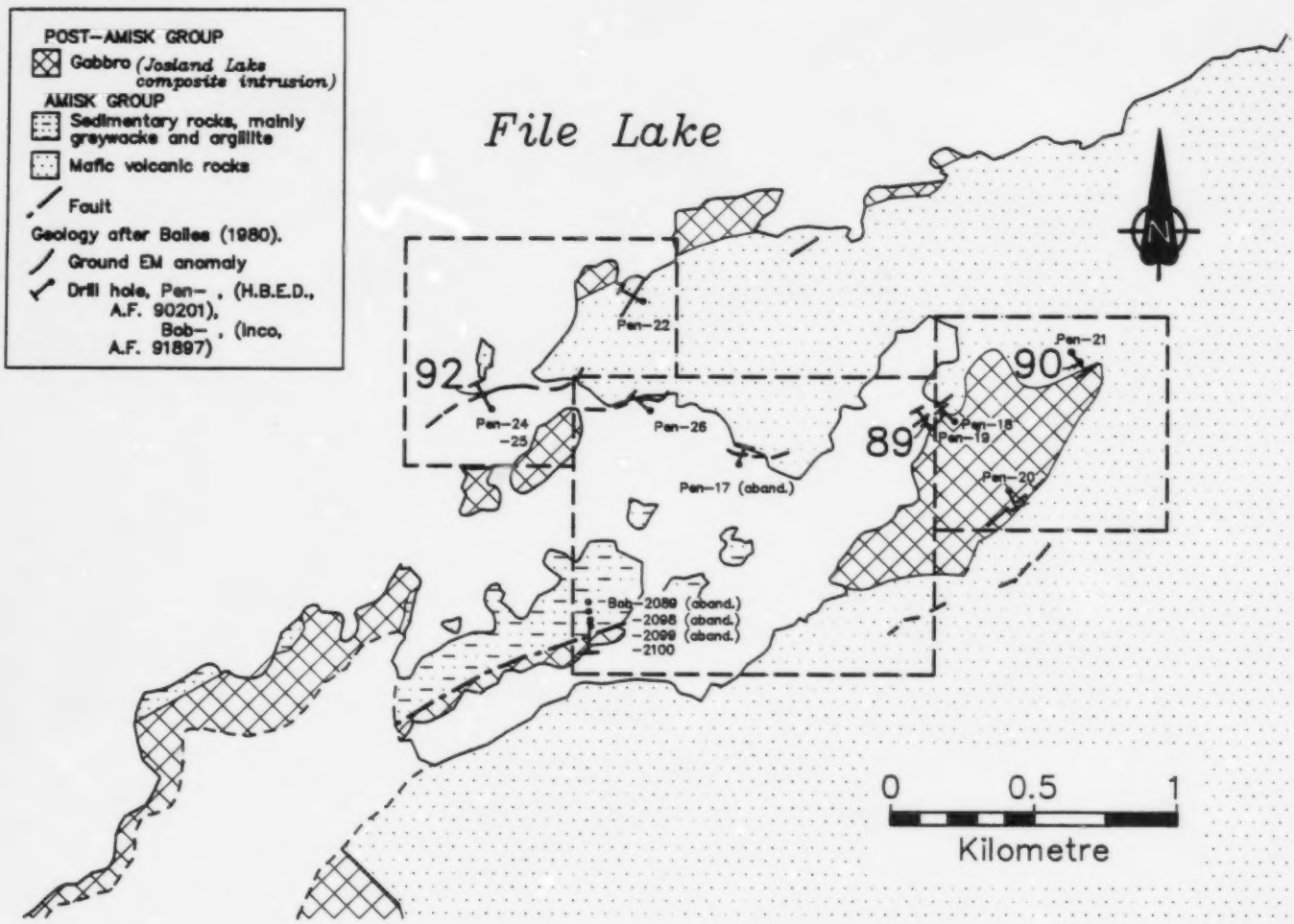



*Figure 89-1: Geological setting and drill hole locations at occurrences 89, 90 and 92*

**LOCATION: 89**

**NAME: Mineralization intersected by diamond drilling**
**UTM: 6080219N/413543E**
**ACCESS: Bush aircraft.**

**AREA: Southeast File Lake**
**AIRPHOTO: A19729-100**

EXPLORATION SUMMARY:

Canadian Nickel Company Limited drilled holes Bob-2089, -2098, -2099, and -2100 totalling 267 m on the Bob-2 claim in 1951; only Bob-2100 (140 m long) was completed (A.F. 91897). HBED drilled holes Pen-17, -19 and -26 (34, 77 and 96 m, long, respectively) to test EM conductors on claim Pen-298 in 1965 (A.F. 90201). Drill hole locations are presented on Figure 89-1.

GEOLOGICAL SETTING:

The general area of occurrence 89 is underlain by Amisk Group mafic volcanic rocks that abut gabbro of the post-Amisk composite Josland Lake gabbroic intrusion. Drill holes intersected sedimentary rocks. White quartzite and quartz-biotite gneiss were intersected in DDH Pen-26 (Fig. 89-1). Part of DDH Pen-26 also intersected metadiorite (A.F. 90201).

MINERALIZATION:

A 0.5 m section of metadiorite in DDH Pen-26 contains quartz veins bearing 20-30% arsenopyrite. Zones from 1 to 45 m in core length contain 50-80% graphite and up to 30% pyrite.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Vein-type deposit. Disseminated arsenopyrite in quartz veins. Additionally, a pyrite-graphite chemical sediment-type deposit was intersected in the same drill hole.

REFERENCES:

Assessment Files 90201, 91897
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

**LOCATION:** 90

**NAME:** Mineralization intersected by diamond drilling
**UTM:** 6080323N/414157E
**ACCESS:** Bush aircraft.

**AREA:** Southeast File Lake (Fig. 89-1)
**AIRPHOTO:** A19729-100

EXPLORATION SUMMARY:

HBED drilled holes Pen-18, -19, -20 and -21 totalling 261 m to test EM conductors on claims Pen-283, -300 and -301 in 1965 (A.F. 90201).

GEOLOGICAL SETTING:

The general area of occurrence 90 is underlain by Amisk Group mafic volcanic rocks and rocks of the post-Amisk composite Josland Lake gabbroic intrusion. The occurrence is located close to the contact between these two units (Fig. 89-1). Drill holes intersected metadiorite of the layered Josland Lake gabbroic sill (A.F. 90201; Bailes, 1980) (Fig. 89-1).

MINERALIZATION:

DDH Pen-21 intersected a 1 m long section containing 60-70% pyrrhotite and 20-30% pyrite in metadiorite. DDH Pen-20 contains several thin pyrite- and pyrrhotite-bearing zones. DDH Pen-18 did not intersect mineralization.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment-type deposit. Sulphide facies iron formation hosted within volcanic xenoliths in metadiorite.

REFERENCES:

Assessment File 90201
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

**LOCATION:** 91

**NAME:** Mineralization intersected by diamond drilling
**UTM:** 6082256N/416119E
**ACCESS:** Bush aircraft.

**AREA:** Southeast File Lake
**AIRPHOTO:** A20135-27

EXPLORATION SUMMARY:

In 1965 HBED drilled Pen-23 (48 m) to test an EM conductor on claim Pen-343 (A.F. 90201) (Fig. 91-1).

GEOLOGICAL SETTING:

The general area is underlain by Amisk Group mafic volcanic flows (Bailes, 1980). The occurrence is located close to the contact between the mafic volcanic rocks and the Ham Lake granodiorite pluton. DDH Pen-23 intersected biotite gneiss (A.F. 90201).

MINERALIZATION:

A 3 m section of drill core contains 10-20% graphite and 5-10% pyrite.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation. Pyritic graphite layer in mafic volcanic rocks.

REFERENCES:

Assessment File 90201
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

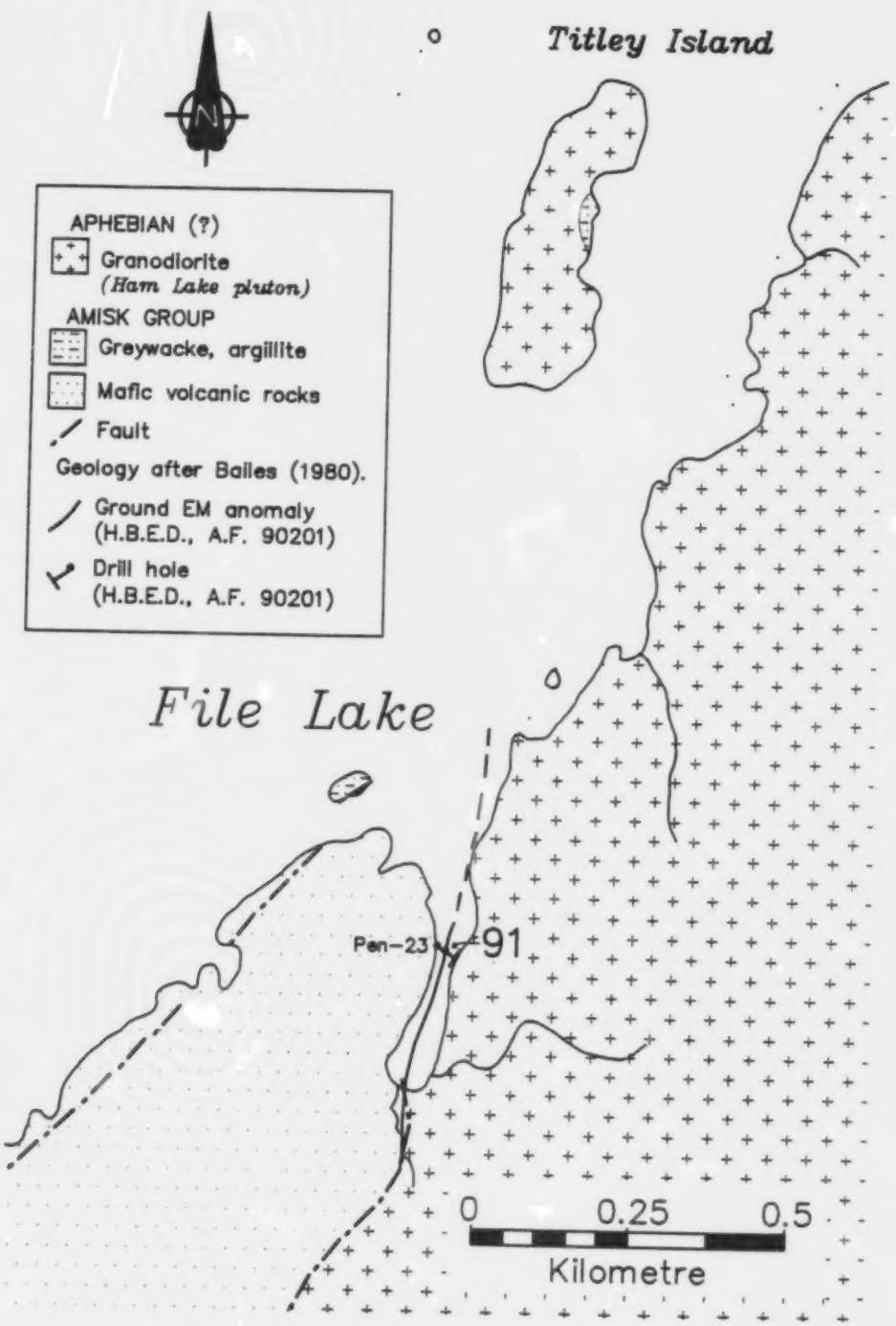



*Figure 91-1: Geological setting and drill hole location at occurrence 91*

**LOCATION:** 92

**NAME:** Mineralization intersected by diamond drilling
**UTM:** 6080320N/412093E
**ACCESS:** Bush aircraft.

**AREA:** Southeast File Lake (Fig. 89-1)
**AIRPHOTO:** A19712-242

EXPLORATION SUMMARY:

HBED drilled holes Pen-22, Pen-24 (abandoned) and Pen-25 (totalling 154 m) to test EM conductors on claims Pen-297 and Pen-307 in 1965 (A.F. 90201).

GEOLOGICAL SETTING:

The general area of occurrence 92 is underlain by Amisk Group mafic volcanic rocks. At the occurrence drill holes intersected mafic gneiss including mafic volcanic rocks and altered sedimentary rocks (Fig. 89-1).

MINERALIZATION:

DDH Pen-25 contained an 18 m section with 60-90% graphite and 10-40% pyrite. DDH Pen-22 contained a 2 m section with 20-30% pyrrhotite and 5% pyrite.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation.

REFERENCES:

Assessment File 90201
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

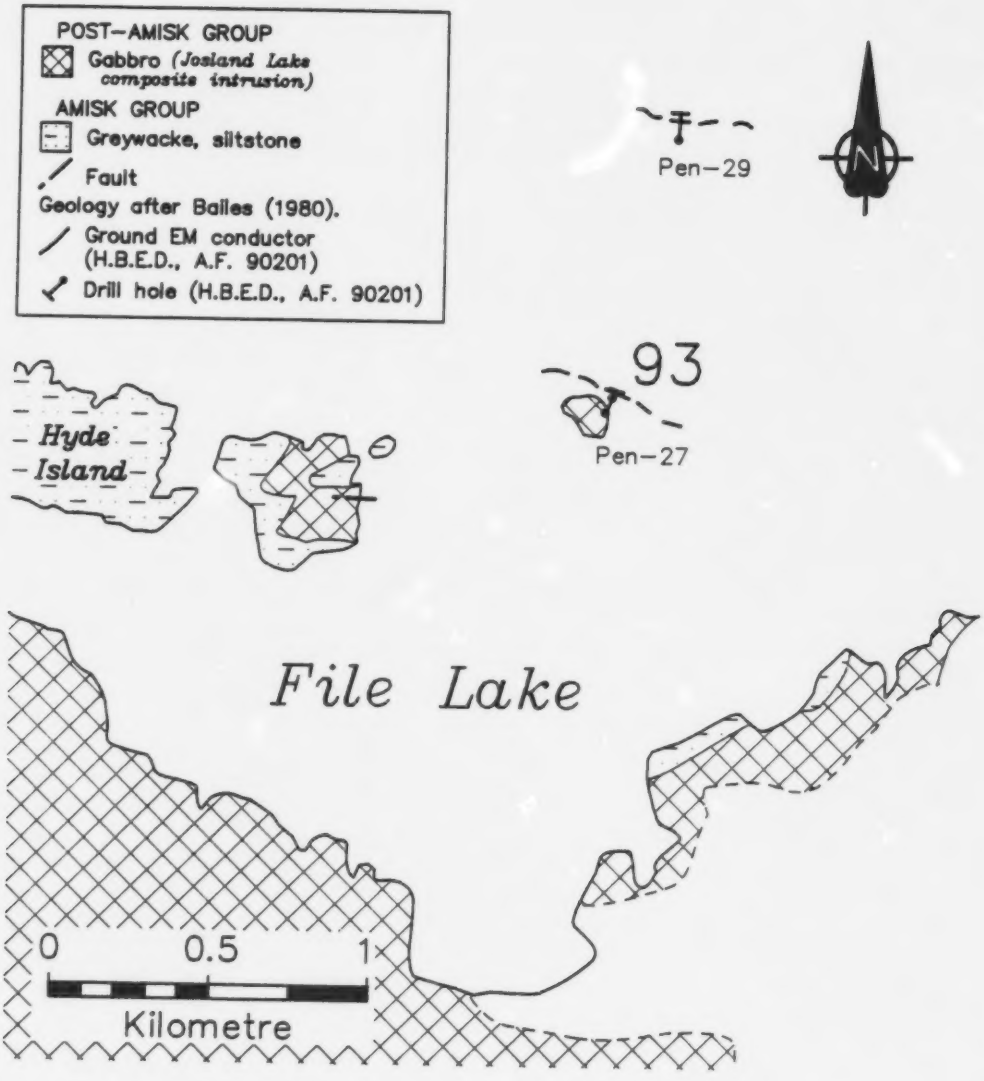



*Figure 93-1: Geological setting and drill hole locations at occurrence 93*

**LOCATION: 93**

**NAME: Mineralization intersected by diamond drilling**
**UTM: 6080427N/410464E**
**ACCESS: Bush aircraft.**

**AREA: Southeast File Lake**
**AIRPHOTO: A19712-249**

EXPLORATION SUMMARY:

HBED drilled holes Pen-27 and Pen-29 (60 and 77 m, respectively) to test EM conductors on claims Pen-293 and Pen-372 in 1965 (A.F. 90201) (Fig. 93-1).

GEOLOGICAL SETTING:

The general area of occurrence 93 is underlain by Amisk Group greywacke and siltstone. These rocks are intruded by the post-Amisk composite Josland Lake gabbroic intrusion (Fig. 93-1). At the occurrence drill holes intersected quartz-biotite-staurolite-garnet gneiss.

MINERALIZATION:

A 3 m section of chloritized quartz-biotite gneiss with 50-60% graphite and 10-30% pyrite were intersected in DDH Pen-27. At the contact between quartz-biotite-garnet-staurolite gneiss and hornblende-carbonate gneiss a mineralized zone of 50-60% graphite and 5% pyrite occurs over a 10 m section in DDH Pen-29.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation. Graphitic and pyritic gneisses of probable sedimentary origin.

REFERENCES:

Assessment File 90201
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

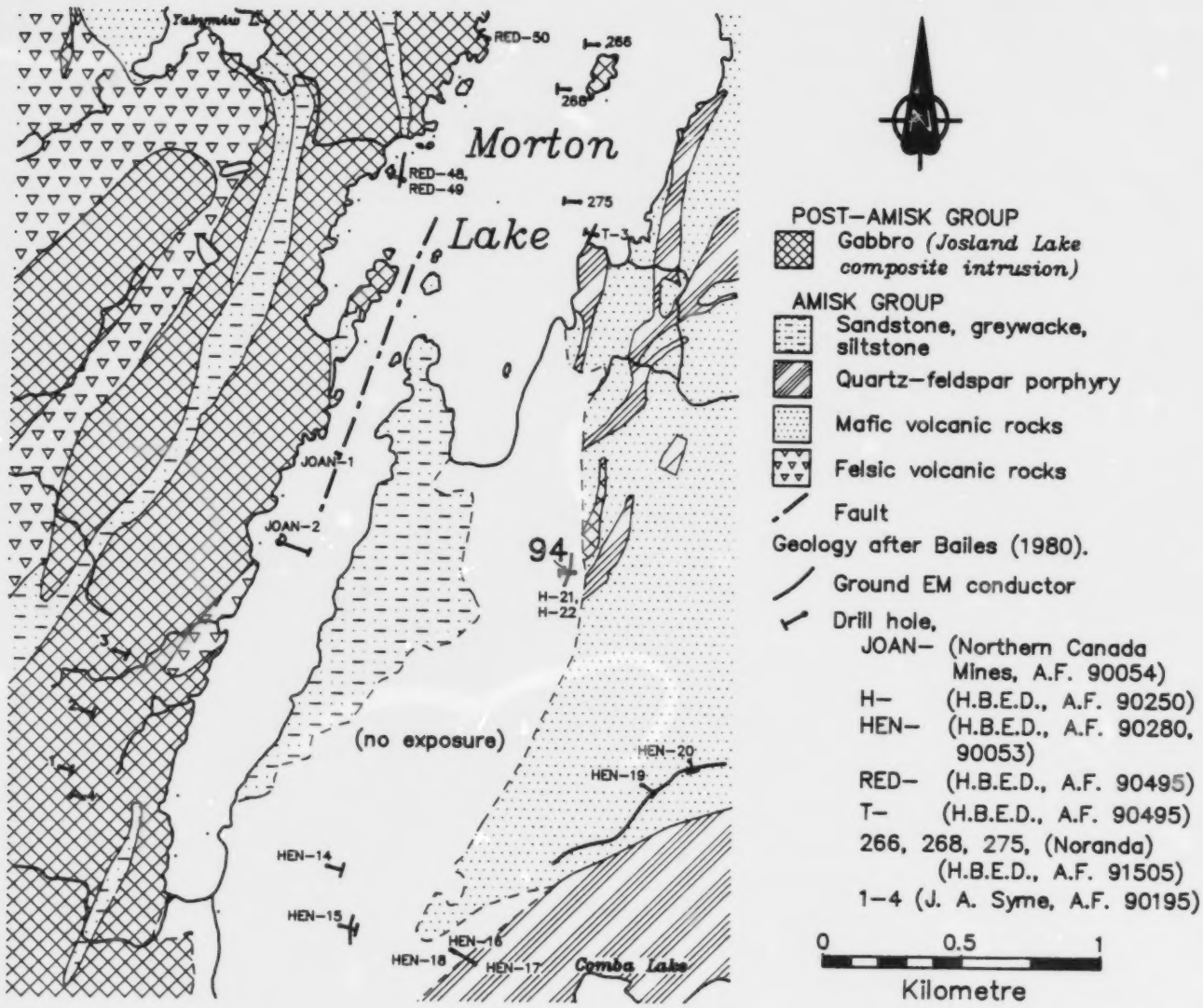



*Figure 94-1: Geological setting and drill hole locations at occurrence 94*

**LOCATION: 94**

**NAME: Mineralization intersected by diamond drilling**
**UTM: 6072910N/407530E**
**ACCESS: Bush aircraft.**

**AREA: Southern Morton Lake**
**AIRPHOTO: A20044-59**

EXPLORATION SUMMARY:

J.A. Syme drilled four holes (305 m total) on the Sul claims in 1956 (A.F. 90195). Northern Canada Mines Limited drilled DDHs Joan-1 (abandoned at 43 m) and Joan-2 (243 m) to test an EM conductor on the Joan claims in 1957 (A.F. 90054). HBED drilled DDHs Hen-14 and -15 (267 m total; A.F. 90053) and Hen-16, -17, -18, -19, and -20 (442 m total) on the Hen claims (A.F. 90055) in 1957. HBED drilled DDHs H-21 (abandoned at 40 m) and H-22 (94 m long) on claim Hen-581 in 1957 (A.F. 90250) and DDH T-3 (74 m) on claim Toe-78 in 1958 (A.F. 90495). HBED drilled Red-48 (abandoned at 25 m) in 1958 and Red-49 (73 m) in 1965 on claim Red-128 (A.F. 90489, 90495). In 1975 HBED drilled DDHs 265, 268 and 275 (depth unknown) on CB 5091 and Noranda drilled a 63 m hole (abandoned in overburden) on CB 6691 (A.F. 91505).

GEOLOGICAL SETTING:

The general area of occurrence 94 is underlain by sandstone, greywacke, siltstone and mafic volcanic rocks. These rocks have been assigned to the Amisk Group. Near the "H" series of drill holes (Fig. 94-1) the rocks are intruded by the post-Amisk composite Josland Lake gabbroic intrusion and quartz-feldspar porphyry. At the occurrence drill holes intersected sequences of greywacke, conglomeratic greywacke and argillite (Fig. 94-1). The Sul drill logs also describe abundant diorite and felsite. The felsite may represent Amisk felsic volcanic rocks since inliers of these rocks have been mapped by Bailes (1980) within the composite Josland Lake gabbroic intrusion. The Hen drill holes intersected mostly felsic volcanic and intrusive rocks.

MINERALIZATION:

DDH H-22 intersected a 13 m long section of siliceous pyritic graphite schist in conglomeratic greywacke, DDH T-3 intersected a 3 m section of earthy pyrite in graphitic argillite. DDH Joan-2 contained a 1 m zone of chlorite schist at the contact between the sedimentary rocks and mafic intrusive rocks. DDH 275 intersected some graphitic sections of tuff but contained no mineralization. The Sul drill holes contain up to 90% pyrrhotite and pyrite with up to 1% chalcopyrite and sphalerite; mineralized sections are up to 15 m in core length. The Hen drill holes intersected trace to near solid pyrrhotite, pyrite and rare chalcopyrite in felsic rocks, but thicknesses of the mineralization are not given in the drill logs.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment-type deposit: The Sul and Hen drill holes intersected sulphide facies iron formation with chalcopyrite and sphalerite. Drill holes H-22, T-3 and 275 intersected graphite-pyrite in greywacke, argillite and tuff, respectively.

REFERENCES:

Assessment Files 90053, 90054, 90055, 90250, 90489, 90495, 90195, 91505
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

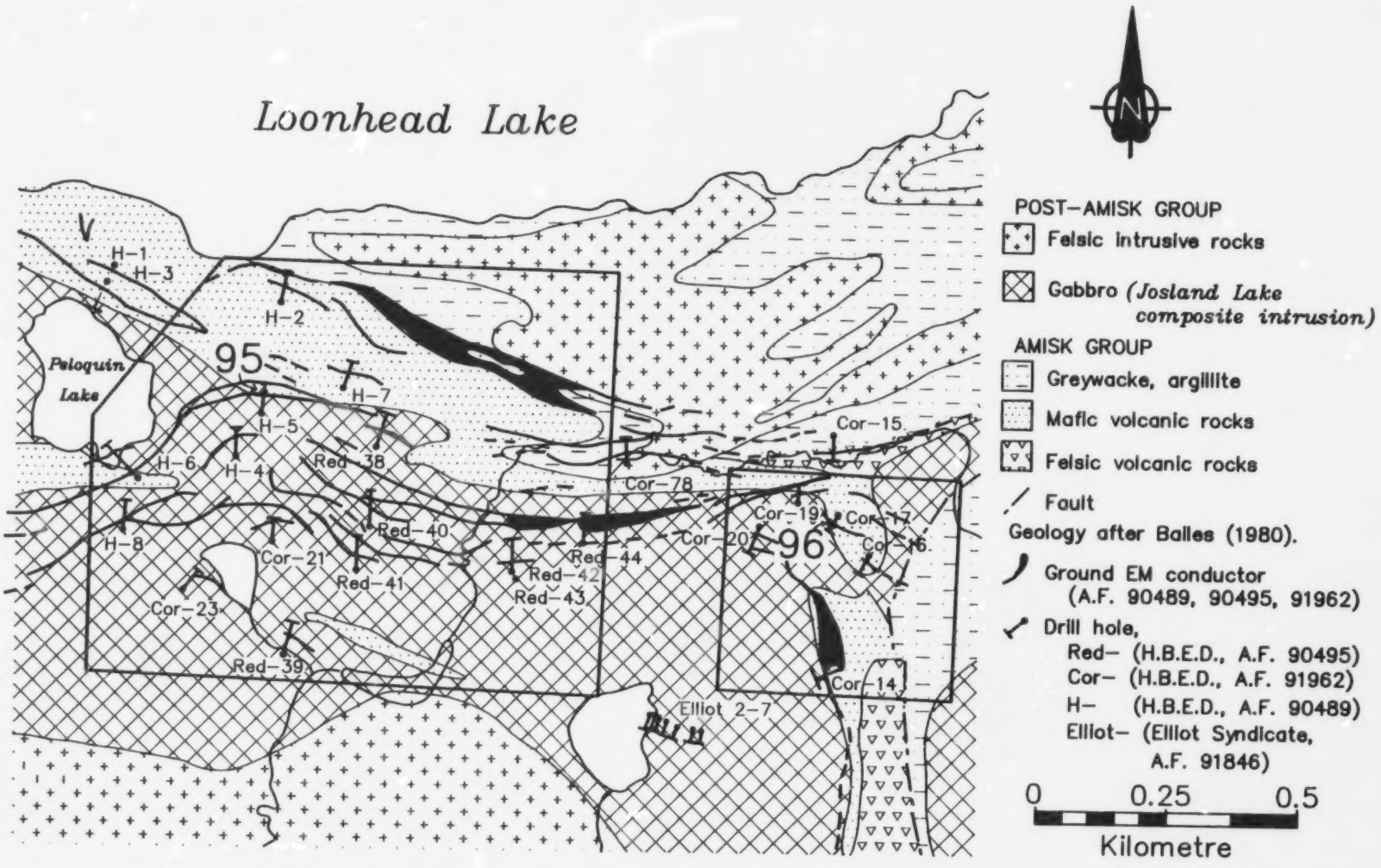



*Figure 95-1: Geological setting and drill hole locations at occurrences 95 and 96*

**LOCATION: 95**

**NAME: Mineralization intersected by diamond drilling**
**UTM: 6088304N/404582E**
**ACCESS: Bush aircraft and traverse.**

**AREA: South of Loonhead Lake**
**AIRPHOTO: A19762-65**

EXPLORATION SUMMARY:

In 1957 HBED drilled holes H-2, -4, -5, -6, -7, and -8 (total 921 m) on the Hed claims (A.F. 90489), and Red-38 and -39 (188 and 117 m, respectively) and Red-40, -41, -42, -43, and -44 (depths unknown) on the Red claims (A.F. 91962). In 1967 HBED drilled Cor-23 and Cor-21 (94 and 155 m, respectively) on the Cor claims.

GEOLOGICAL SETTING:

The general area of occurrence 95 is underlain by Amisk Group mafic volcanic rocks flanked to the south by the composite Josland Lake gabbroic intrusion and to the north by Amisk Group greywacke, argillite and post-Amisk felsic intrusive rocks (Fig. 95-1). Drill holes intersected hornblende ± quartz ± biotite gneiss and andesite.

MINERALIZATION:

Up to 3 m long core sections contain moderate to near solid pyrite and pyrrhotite in hornblende gneiss and gabbro.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation. Moderate to near solid Fe-sulphides in mafic (volcanic-derived?) gneiss and gabbro.

REFERENCES:

Assessment Files 90489, 90495, 91962
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

**LOCATION: 96**

**NAME: Mineralization intersected by diamond drilling**
**UTM: 6087827N/406945E**
**ACCESS: Bush aircraft and traverse.**

EXPLORATION SUMMARY:

HBED drilled DDHs Cor-17 and Cor-19 (84 m total) and Cor-2, -14, -16 and -20 (no drill logs available) on the Cor claims in 1967 (A.F. 91962).

GEOLOGICAL SETTING:

The general area of occurrence 96 is underlain by Amisk Group mafic volcanic rocks. The occurrence is situated approximately 50 m northeast of the contact between the host mafic volcanic rocks and the composite Josland Lake gabbroic intrusion (Fig. 95-1). At the occurrence drill holes intersected sequences of coarse grained andesite, including a 9-10 m long section of rhyolite. The rhyolite is probably part of the Storozuk Formation that is comprised of mafic and lesser felsic volcanic rocks (Bailes, 1980) (Fig. 95-1).

MINERALIZATION:

Drill core from the rhyolite zone contains unspecified amounts of pyrite and pyrrhotite.

**AREA: West of Corley Lake (Fig. 95-1)**
**AIRPHOTO: A20044-71**

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Disseminated mineralization - not classified. Fe-sulphide mineralization is associated with rhyolitic rocks in a sequence of mostly mafic volcanic flows and fragmental rocks.

REFERENCES:

Assessment File 91962
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

**LOCATION: 97**

**NAME: Mineralization intersected by diamond drilling**
**UTM: 6086184N/408395E**
**ACCESS: Bush aircraft and traverse.**

**AREA: West of Corley Lake**
**AIRPHOTO: A20044-69**

EXPLORATION SUMMARY:

The Elliot Syndicate drilled DDHs Elliot-1 and -8 (total 115 m) on claim Elliot-1 in 1952 (A.F. 91846). HBED drilled Cor-10 (100 m), Cor-13 and -22 (lengths unknown) on the Cor claims in 1967 (A.F. 91962).

GEOLOGICAL SETTING:

The general area of occurrence 97 is underlain by Amisk Group greywacke and siltstone. These rocks are flanked to the west by post-Amisk mafic volcanic rocks (Fig. 97-1). At the occurrence drill holes intersected quartz-hornblende schist to gneiss.

MINERALIZATION:

DDH Cor-10 intersected 36 m of quartz-hornblende gneiss that contained numerous thin zones of disseminated Fe-sulphides and graphite. DDH Elliot 1 contained minor chalcopyrite.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation. Sulphidic and graphitic metasedimentary gneisses.

REFERENCES:

Assessment Files 91846, 91962
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

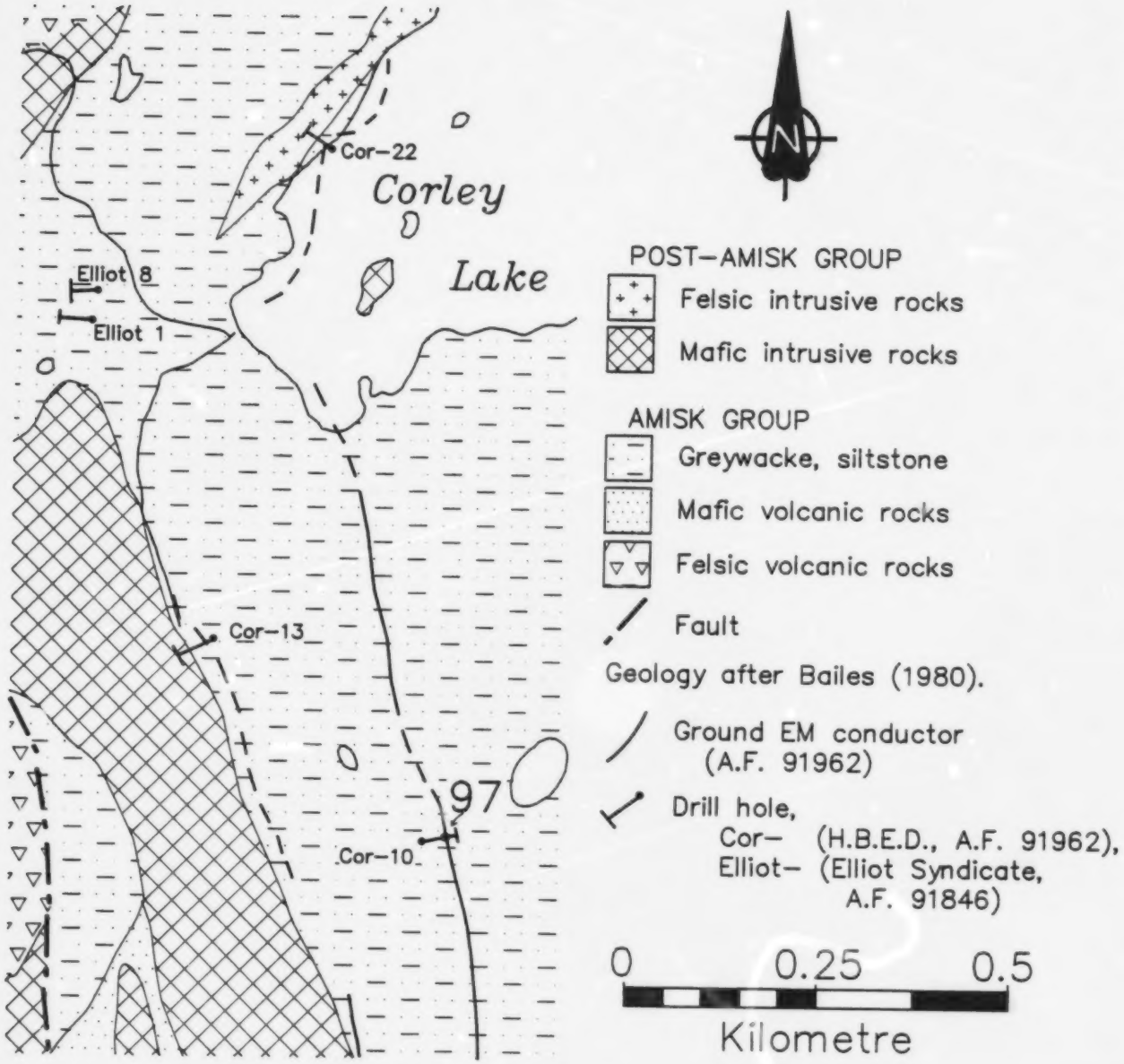



*Figure 97-1: Geological setting and drill hole locations at occurrence 97*

**LOCATION: 98**

NAME: Mineralization intersected by diamond drilling
UTM: 6073306N/428542E
ACCESS: Ghost Mine Road.

AREA: Between Edwards and Stroud (a.k.a. Hub) lakes
AIRPHOTO: A26366-186

EXPLORATION SUMMARY:

The Hub claims were recorded by N. Leslie in 1954, transferred to R.G. Crosby in 1955 and optioned to HBED in 1955. Two holes totalling 425 m were drilled by HBED in 1955 (A.F. 90059). The option agreement was abandoned in 1957 and the claim was cancelled in 1958. The Tap claims were staked in place of the previous Hub claims for Canadian Nickel Company Limited in 1965. A magnetometer survey was conducted and six holes totalling 396 m were drilled in 1966-67 (A.F. 90199, 90062, 90200). The claim was cancelled in 1971. The current Mud claims were staked over this area in 1971 on behalf of HBED.

GEOLOGICAL SETTING:

The general area of occurrence 98 is a geologically complex area containing north-facing Amisk Group mafic flows, fragmental rocks and heterolithic breccia, felsic flows and volcaniclastic rocks, greywacke and mafic and felsic dykes (Fig. 98-1). Silicification, Fe-Mg metasomatic alteration, pyritization and epidotization are common in the Edwards-Stroud lakes area (Bailes et al., 1987). Drill holes intersected andesite, diorite, and siliceous sericite-biotite-chlorite schist.

MINERALIZATION:

Drilling intersected disseminated and near solid bands of pyrrhotite and pyrite with rare chalcopyrite and/or sphalerite (A.F. 90059, 90062, 90200). Drill logs describe the sulphide mineralization in association with siliceous sericite-biotite-chlorite schist. This sulphide zone has been traced for 9 km by geophysics and drilling. Bailes (1987a) has correlated this zone with a barren sulphide zone that occurs 10 m stratigraphically above the Anderson Cu-Zn orebody.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation hosted by greywacke and argillite.

REFERENCES:


Assessment Files 90059, 90062, 90067, 90199, 90200
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1987a: Chisel-Morgan lakes project; In Manitoba Energy and Mines, Report of Field Activities 1987, p. 70-79.

Bailes, A.H.
1987b: Chisel-Morgan lakes; Manitoba Energy and Mines, Preliminary Map 1987S-1, Scale 1:15 840.

Bailes, A.H., Syme, E.C., Galley, A., Price, D.P., Skirrow, R. and Ziehlke, D.V.
1987: Early Proterozoic volcanism, hydrothermal activity, and associated ore deposits at Flin Flon and Snow Lake, Manitoba; Geological Association of Canada, Field Trip Guidebook 1, 95 p.

Froese, E. and Moore J.M.
1980: Metamorphism in the Snow Lake area, Manitoba; Geological Survey of Canada, Paper 78-27, 16 p.

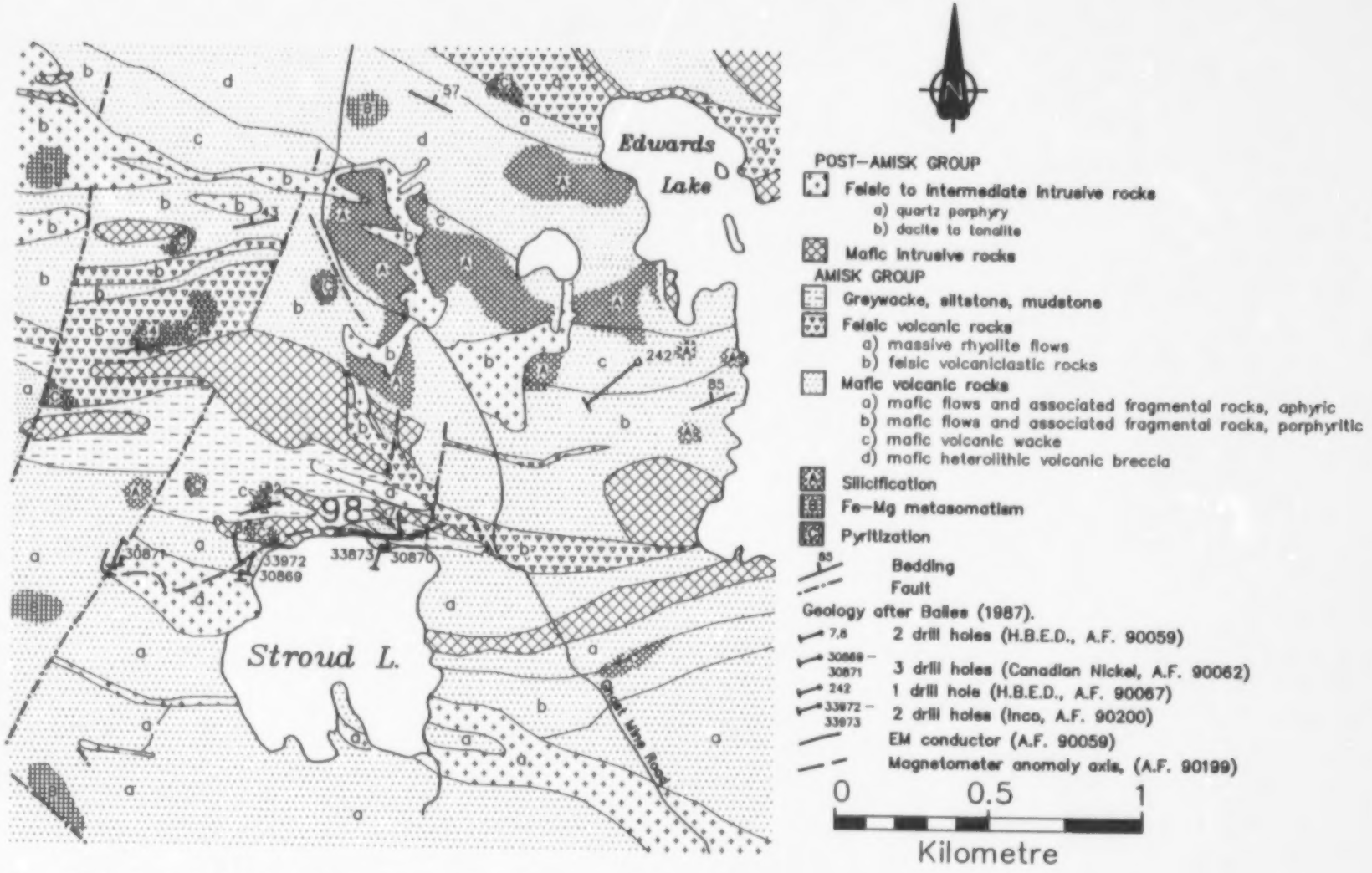



*Figure 98-1: Geological setting and drill hole locations at occurrence 98*

**LOCATION: 99**

**NAME: Mineralization intersected by diamond drilling**
**UTM: 6082894N/406666E**
**ACCESS: Bush aircraft and traverse.**

**AREA: Northeast of Morton Lake**
**AIRPHOTO: A20044-67**

EXPLORATION SUMMARY:

In 1956 HBED drilled DDHs Red-19 (147 m) and Red-20 (87 m) on the Red claims (A.F. 90495) and Tom-4 (74 m) and Tom-8, -10, -12, -14, -16, and -18 (no drill logs available) on the Tom claims (A.F. 90056). Northern Canada Mines Limited drilled DDH Bill-2 (74 m) in 1957 (A.F. 90202). HBED drilled DDH Cor-11 (137 m) on claim Cor-9 in 1967 (A.F. 91962).

GEOLOGICAL SETTING:

The general area of occurrence 99 is underlain by post-Amisk mafic intrusive rocks with inliers of Amisk mafic and felsic volcanic rocks (Fig. 99-1). The drilling was undertaken to test an EM conductor near the contact between felsic tuffs and flows of the Storozuk Formation and gabbroic rocks of the Josland Lake composite intrusion (Bailes, 1980; Fig. 99-1).

MINERALIZATION:

DDH Bill-2 contained three zones up to 1 m long with 5-15% pyrrhotite and minor pyrite, and a 7 m chloritized section with 15% pyrrhotite, pyrite and trace chalcopyrite in greywacke. DDH Red-19 included a 6 m section containing near solid pyrrhotite and minor pyrite at the contact between andesite and quartz-biotite-garnet gneiss. DDH Red-20 contained moderate to near solid pyrrhotite and pyrite in a 2 m rhyolite section. DDH Cor-11 intersected mafic intrusive rocks containing 1-3% pyrrhotite and pyrite disseminated throughout the entire core length. A thin (1.5 m long) silicified zone with moderate to near solid Fe-sulphides and graphite was intersected in DDH Tom-4.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation. DDHs Bill-2, Red-19 and Red-20 apparently test the same EM conductors. All drill holes intersected moderate amounts of Fe-sulphide in narrow zones within volcanic and (volcanic-derived?) sedimentary rocks. This zone represents a sulphide facies iron formation. Nearby, DDHs Cor-11 and Tom-4 contain disseminated to near solid Fe-sulphides and graphite within mafic intrusive rocks.

REFERENCES:

Assessment File 90056, 90202, 90495, 91962
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

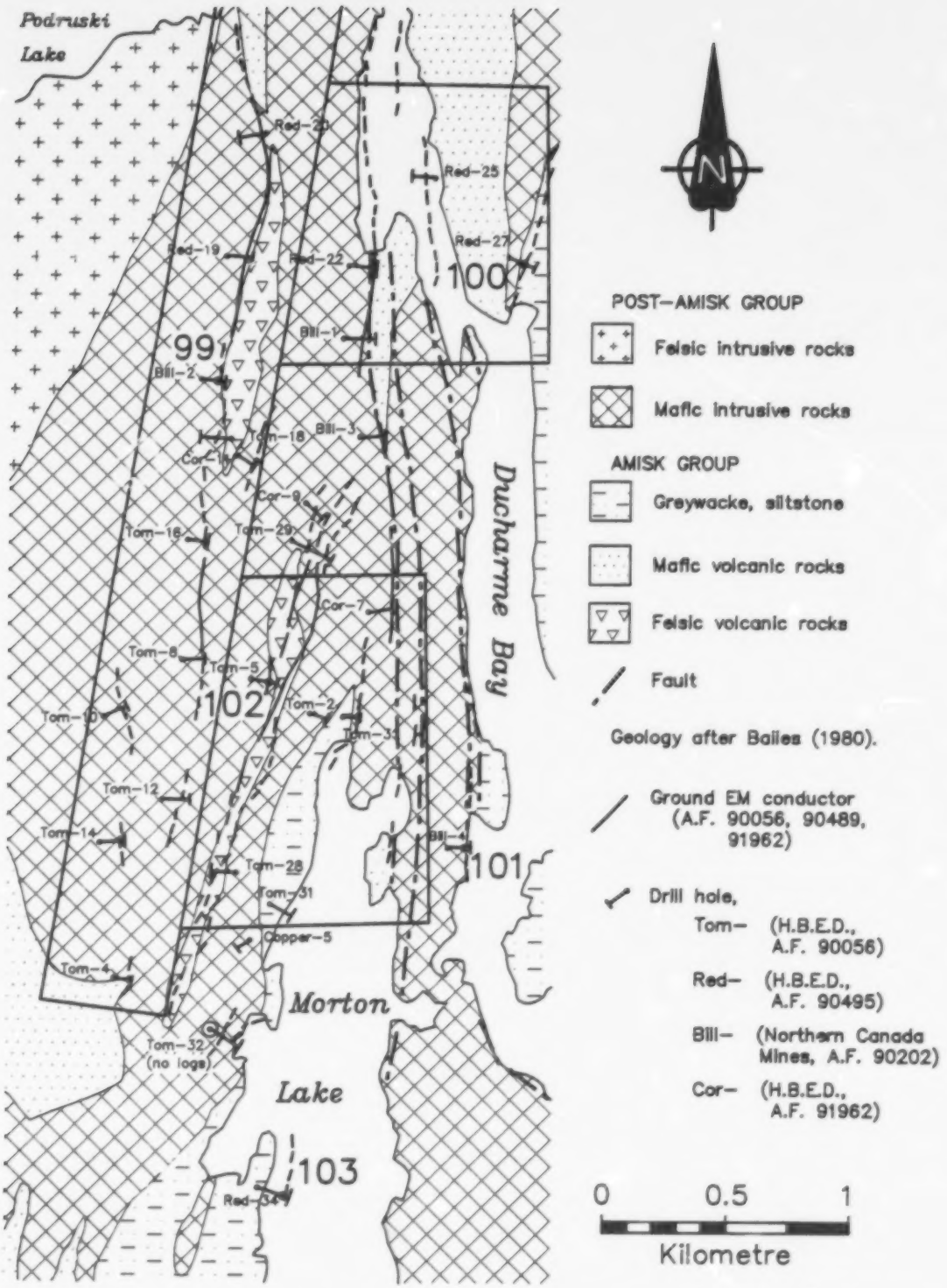



*Figure 99-1: Geological setting and drill hole locations at occurrences 99, 100, 101, 102 and 103*

**LOCATION:** 100

**NAME:** Mineralization intersected by diamond drilling
**UTM:** 6083379N/407877E
**ACCESS:** Bush aircraft and traverse.

**AREA:** North end of Morton Lake (Fig. 99-1)
**AIRPHOTO:** A20044-67

EXPLORATION SUMMARY:

HBED drilled Red-22, -25 and -27 (total 349 m) on the Red claims in 1956 (A.F. 90495). Northern Canada Mines Limited drilled Bill-1 (107 m in length) in 1957 (A.F. 90202).

GEOLOGICAL SETTING:

The general area of occurrence 100 is underlain by Amisk Group greywacke and siltstone. These rocks have been intruded by post-Amisk mafic intrusions. At the occurrence drill holes intersected argillite and greywacke, and lesser quartz-biotite schist and sheared andesite (Fig. 99-1).

MINERALIZATION:

The mineralized zone is reflected by a ground EM conductor close to the contact between greywacke and a mafic intrusion. Several sections up to 5 m in core length in DDHs Red-22 and Red-27 contain pyrite and graphite. DDH Bill-1 intersected narrow sections that contain pyrrhotite and pyrite.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron frmation. Pyritic and graphitic argillite and greywacke.

REFERENCES:

Assessment File 90202, 90495
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

**LOCATION:** 101

**NAME:** Mineralization intersected by diamond drilling
**UTM:** 6080963N/407755E
**ACCESS:** Bush aircraft.

EXPLORATION SUMMARY:

Northern Canada Mines Limited drilled DDH Bill-4 (136 m in length) on claim Bill-26 in 1957 (A.F. 90202) and HBED drilled Pen-28 (69 m) in 1965 to test an EM conductor on claim Pen-270 (A.F. 90201).

GEOLOGICAL SETTING:

The general area of occurrence 101 is underlain by post-Amisk mafic intrusive rocks flanked to the east and west by Amisk Group greywacke and siltstone. The occurrence is located adjacent to the contact between the mafic intrusive and sedimentary rocks. At the occurrence drill holes intersected argillaceous sedimentary rocks including quartz-biotite gneiss (Fig. 99-1).

MINERALIZATION:

DDH Pen-28 intersected a 1 m section with 60-70% graphite and 20-30% pyrite. DDH Bill-4 intersected a 9 m graphitic Fe-sulphide-bearing section.

**AREA:** Southwest File Lake (Fig. 99-1)
**AIRPHOTO:** A20044-65

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation. Graphitic and sulphidic argillaceous rocks.

REFERENCES:

Assessment File 90201, 90202
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

**LOCATION:** 102

**NAME:** Mineralization intersected by diamond drilling
**UTM:** 6081633N/406849E
**ACCESS:** Bush aircraft.

**AREA:** North Morton Lake (Fig. 99-1)
**AIRPHOTO:** A20044-65

EXPLORATION SUMMARY:

In 1956 HBED drilled DDH Tom-5 (226 m in length), and Tom-2, -3, -28 and -31 (no drill logs available) on the Tom claims (A.F. 90056). In 1967 HBED drilled DDH Cor-7 (65 m) on claim Cor-1 (A.F. 91962).

GEOLOGICAL SETTING:

The general area of occurrence 102 is underlain by post-Amisk mafic intrusive rocks containing inliers of Amisk felsic volcanic rocks. At the occurrence drill holes intersected gabbro of the Josland Lake layered intrusive complex (Fig. 99-1).

MINERALIZATION:

DDH Tom-5 intersected several zones from 0.5 to 11 m in core length containing moderate to near solid pyrrhotite and pyrite hosted by gabbro and apparent xenoliths of siliceous volcanic and graphitic sedimentary rocks. DDH Cor-7 contained several narrow zones with 5-30% graphite, pyrite and pyrrhotite.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation. Graphitic and sulphidic xenoliths of volcanic and sedimentary rocks within the gabbro.

REFERENCES:

Assessment File 90056, 91962
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

**LOCATION:** 103

**NAME:** Mineralization intersected by diamond drilling
**UTM:** 6079463N/406995E
**ACCESS:** Bush aircraft.

EXPLORATION SUMMARY:

HBED drilled DDH Red-34 (191 m in length) on claim Red-60 in 1956 (A.F. 90495).

GEOLOGICAL SETTING:

The general area of occurrence 103 is underlain by Amisk Group greywacke and siltstone flanked to the east and west by post-Amisk mafic intrusive rocks. At the occurrence DDH Red-34 intersected andesitic and rhyolitic volcanic rocks (Fig. 99-1).

MINERALIZATION:

Two sections of drill core, 1 and 3 m in length, contain moderate to near solid pyrite and pyrrhotite and traces of chalcopyrite in andesite and rhyolite.

**AREA:** Northwest Morton Lake (Fig. 99-1)
**AIRPHOTO:** A20044-64

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment-type deposit, sulphide facies iron formation. Sulphide mineralization is hosted by intermediate and felsic volcanic rocks.

REFERENCES:

Assessment File 90495
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

**LOCATION: 104**

**NAME: Mineralization intersected by diamond drilling**
**UTM: 6078566N/405220E**
**ACCESS: Bush aircraft and traverse.**

**AREA: 63K/16SW; west of Morton Lake**
**AIRPHOTO: A20044-62**

EXPLORATION SUMMARY:

In 1956 HBED drilled DDHs Red-6, -7, -9, -11 and -13 (total 611 m) to test EM conductors on the Red claims (A.F. 90495).

GEOLOGICAL SETTING:

The general area of occurrence 104 is underlain by Amisk Group mafic volcanic rocks, greywacke, siltstone, and lesser felsic volcanic rocks intruded by post-Amisk mafic intrusions (Fig. 104-1). At the occurrence drill holes intersected rhyolite with lesser amounts of quartz porphyry, altered flows (composition unknown) and andesite.

MINERALIZATION:

The ground EM conductor delineating the mineralization occurs at or near the contact between mafic volcanic rocks and mafic intrusions (Fig. 104-1). Zones from 1 to 16 m in core length contain moderate to near solid pyrite and pyrrhotite and traces of chalcopyrite and sphalerite within rhyolite.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation.

REFERENCES:

Assessment File 90495
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

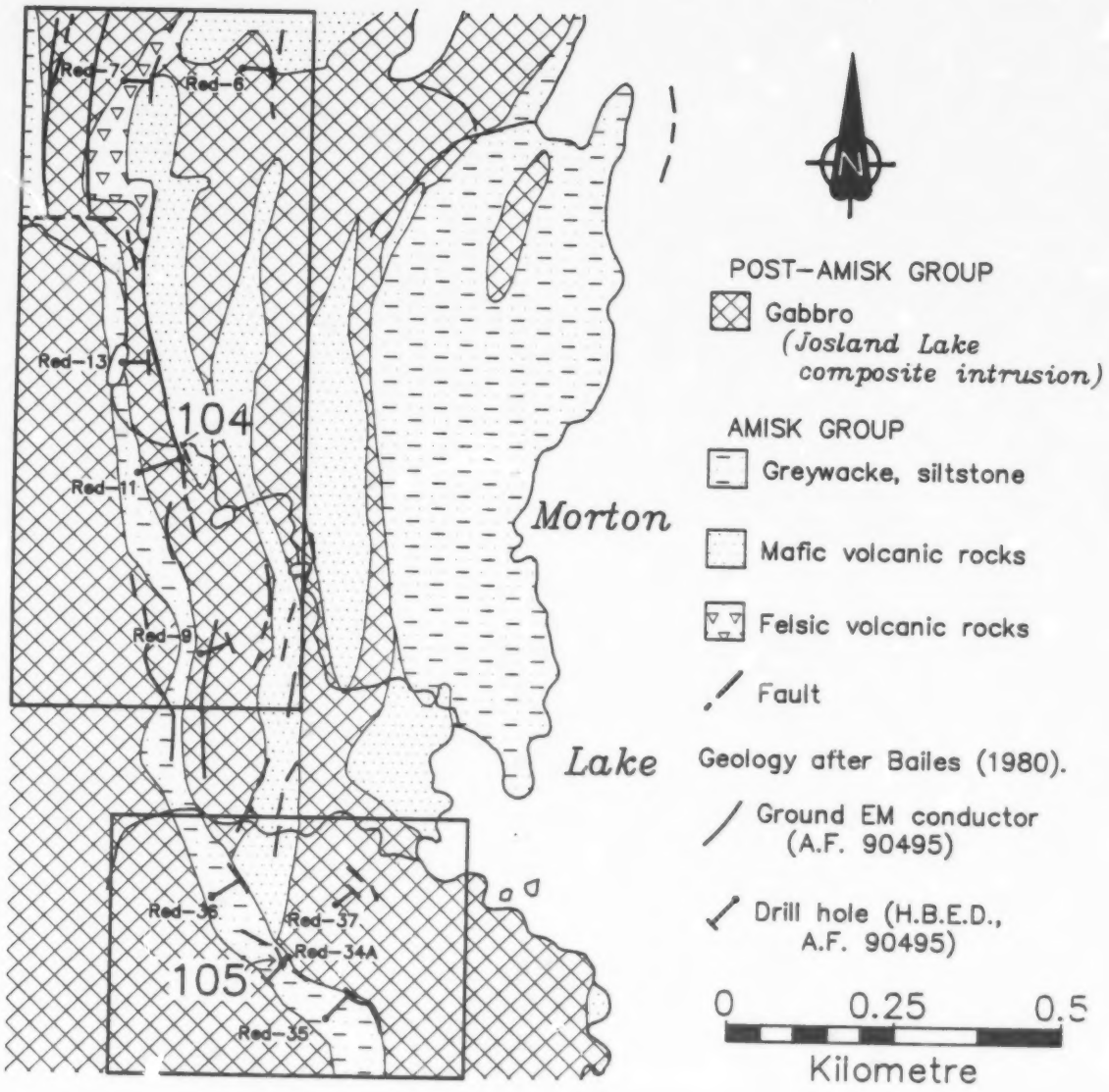



*Figure 104-1: Geological setting and drill hole locations at occurrences 104 and 105*

**LOCATION:** 105

**NAME:** Mineralization intersected by diamond drilling
**UTM:** 6077128N/405977E
**ACCESS:** Bush aircraft and traverse.

**AREA:** 63K/16SW; west of Morton Lake (Fig. 104-1)
**AIRPHOTO:** A20044-63

EXPLORATION SUMMARY:

In 1957 HBED drilled DDHs Red-34A, -35, -36, and -37 (total 356 m) to test EM conductors on the Red claims (A.F. 90495). In 1982 HBED drilled DDH Eel-303 (70 m) on CB 9234 (A.F. 92508).

GEOLOGICAL SETTING:

The general area of occurrence 105 is underlain by Amisk Group greywacke, siltstone and mafic volcanic rocks flanked to the east and west by mafic intrusive rocks. Drill holes intersected predominantly argillaceous rocks (Fig. 104-1).

MINERALIZATION:

The ground EM conductors delineating the mineralized zones follow, in part, the contact between greywacke-siltstone and the mafic intrusive rocks (Fig. 104-1). Graphite was observed locally in drill core. Graphitic zones in DDH Red-34A and Eel-303 contain minor pyrrhotite and pyrite.

GEOCHEMICAL DATA:

DDH Eel-303 contained a 0.3 m section assaying 0.51% Cu and 0.075% Zn and a separate 0.3 m section with a 0.175% Cu and 0.09% Zn.

CLASSIFICATION:

Chemical sediment type deposit; sulphide facies iron formation. Graphitic and sulphidic argillite.

REFERENCES:

Assessment Files 90495, 92508
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

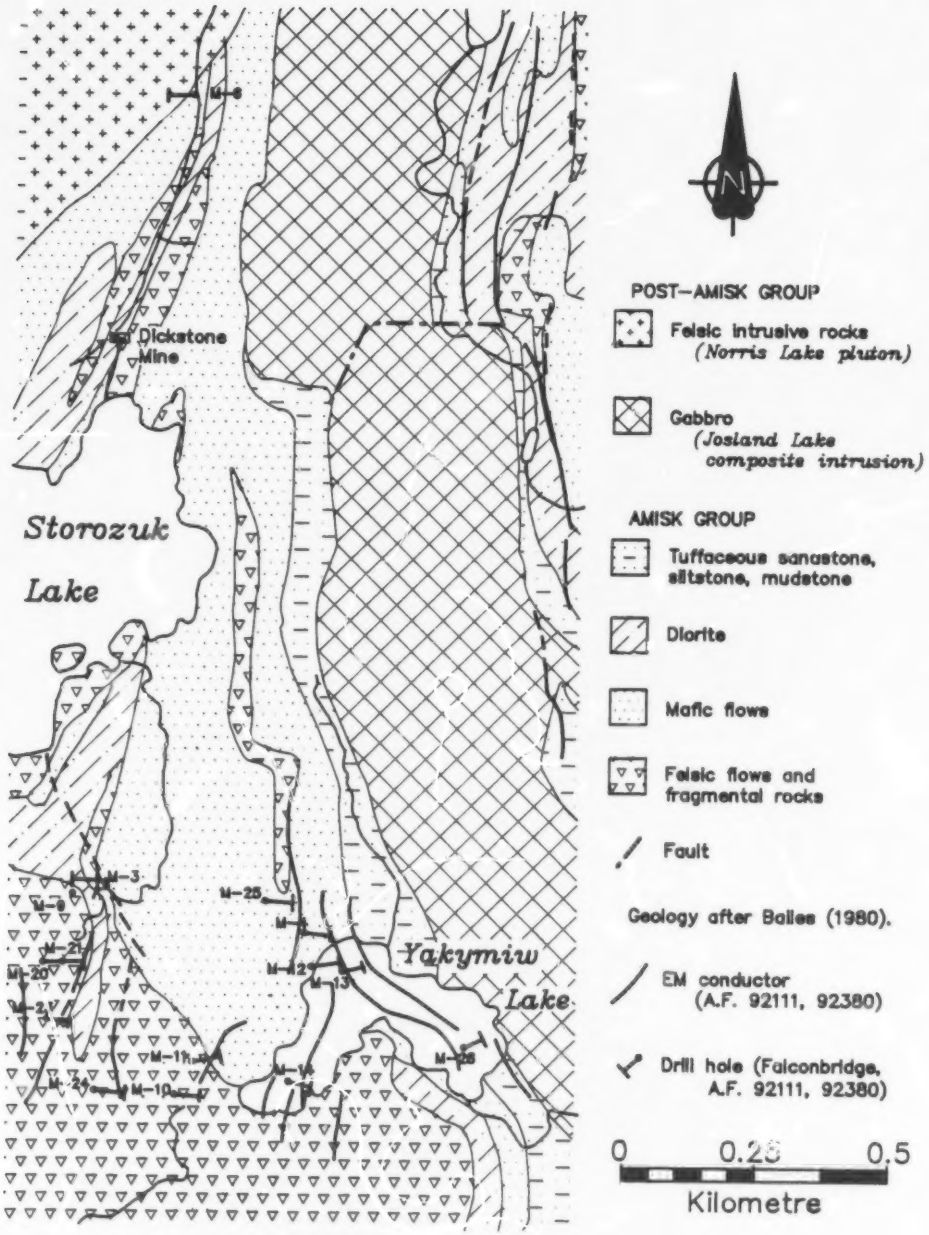



*Figure 106-1: Geological setting and drill hole locations at occurrence 106*

**LOCATION:** 106

**NAME:**

**UTM:** 6076858N/404802E

**ACCESS:** Bush aircraft, road to Dickstone Mine.

**AREA:** 63K/16SW; Yakimiw Lake

**AIRPHOTO:** A19762-93

EXPLORATION SUMMARY:

Falconbridge Nickel Mines Limited drilled fifteen holes totalling 1286 m on the Mor claims in 1969 (A.F. 92111, 92380). Although mineralization was not indicated in the drill logs, results of this drilling are included in this volume to provide the reader with complete information regarding non-confidential drill records.

GEOLOGICAL SETTING:

Drill holes intersected mafic to felsic volcanic rocks, including tuffaceous rocks, lesser amphibolite, diorite, argillite, greywacke and quartz-feldspar ± biotite schist and gneiss (Fig. 106-1).

MINERALIZATION:

None.

GEOCHEMICAL DATA:

None.

CLASSIFICATION:

Not classified.

REFERENCES:

Assessment File 92111, 92380
Manitoba Energy and Mines, Minerals Division.

Bailes, A.H.
1980: Geology of the File Lake area; Manitoba Mineral Resources Division, Geological Report 78-1, 134 p.

# APPENDIX I: MULTI-ELEMENT GEOCHEMICAL ROCK ANALYSES

Rock samples were routinely collected as (1) bulked or composite continuous chip samples over 1 or 2 m intervals from trenches and/or outcrop, (2) single or multiple 1-2 kg samples from representative mineralized zones in trenches and outcrop, or (3) chips or sections of split drill core from specific intervals in a drillhole. These samples were routinely analyzed by Acme Analytical Laboratories Ltd. (Vancouver) by digesting 0.500 g of rock powder with 3 ml of 3:1:2 $HCl$-$HNO_3$-$H_2O$ at 95°C for one hour and then diluted to 10 ml with deionised water. This solution is then analyzed by inductively coupled argon plasma-atomic absorption spectrophotometry (ICP-AAS) for 30 elements. The lower limit of detection (LLD) for Au using a 0.500 g sample aliquot is 3 ppm, which was considered too high for the purposes of this study. Accordingly, a LLD of 1 ppb was attained for Au with a preconcentration of a 10 g sample and AAS finish. Assay data for Cu, Pb, Zn, Au and Ag obtained from the analytical laboratories of the Geological Services Branch is presented on figures or in tables accompanying individual mineral occurrence descriptions. All other analytical specifications are given below.

Specifications:

1. Au1: Au by ICP on 10 g sample.
2. Au2: Au, Pt and Pd by INAA on 50g sample.
3. All other analyses by ICP on 0.500g sample after a 3-1-2 $HCL$-$HNO_3$-$H_2O$ dissolution. This digestion is partial for Mn, Fe, Ca, P, La, Cr, Mg, Ba, Ti, B, W, Na, K, Al.
4. Hg by flameless AAS.

# Rock Geochemical Data

| Mineral Occurrence | UTM Coordinates Northing | Easting | Sample Numbers | Mo (ppm) | Cu (ppm) | Pb (ppm) | Zn (ppm) | Au1 (ppb) | Au2 (ppb) | Pt (ppb) | Pd (ppb) | Ag (ppm) | As (ppm) | Sb (ppm) | Bi (ppm) | Cd (ppm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 63K16-01 | 6086569 | 434664 | 841140 | 2 | 75 | 4 | 46 | 615 | | | | 0.1 | 9248 | 2 | 2 | 1 |
| | | | 841141 | 2 | 93 | 11 | 74 | 31600 | | | | 1.8 | 32902 | 4 | 2 | 1 |
| | | | 841142 | 2 | 50 | 5 | 67 | 295 | | | | 0.2 | 3007 | 2 | 2 | 1 |
| | | | 852995 | 1 | 46 | 6 | 54 | 11 | | | | 0.2 | 80 | 3 | 2 | 1 |
| | | | 852996 | 2 | 45 | 9 | 64 | 7 | | | | 0.2 | 376 | 4 | 2 | 1 |
| | | | 852997 | 1 | 37 | 8 | 50 | 15 | | | | 0.1 | 889 | 2 | 2 | 1 |
| | | | 852998 | 1 | 39 | 3 | 80 | 1 | | | | 0.2 | 32 | 2 | 2 | 1 |
| | | | 852999 | 1 | 36 | 13 | 59 | 225 | | | | 0.1 | 134 | 2 | 2 | 1 |
| | | | 853000 | 1 | 42 | 30 | 66 | 12 | | | | 0.2 | 270 | 2 | 2 | 1 |
| | | | 853001 | 1 | 63 | 26 | 98 | 9380 | 5400 | | 4 | 0.8 | 17291 | 2 | 2 | 1 |
| | | | 853002 | 1 | 50 | 6 | 55 | 68 | | | | 0.2 | 58 | 2 | 2 | 1 |
| | | | 853003 | 1 | 29 | 6 | 70 | 6 | | | | 0.2 | 100 | 2 | 2 | 1 |
| | | | 853008 | 1 | 32 | 7 | 37 | 420 | | | | 0.2 | 11328 | 2 | 3 | 1 |
| | | | 853012 | 1 | 33 | 6 | 71 | 14 | | | | 0.1 | 60 | 2 | 2 | 1 |
| | | | 853013 | 2 | 33 | 6 | 71 | 32 | | | | 0.2 | 16 | 2 | 2 | 1 |
| | | | 853014 | 2 | 42 | 3 | 14 | 890 | | | | 0.1 | 8624 | 3 | 2 | 1 |
| 63K16-02 | 6084045 | 434480 | 850233 | 2 | 131 | 11 | 88 | 3 | | | | 0.1 | 31 | 2 | 2 | 1 |
| | | | 850234 | 1 | 331 | 5 | 118 | 2 | | | | 0.1 | 5 | 2 | 2 | 1 |
| | | | 850235 | 3 | 188 | 6 | 135 | 1 | | | | 0.1 | 48 | 2 | 2 | 1 |
| 63K16-03 | 6083919 | 428509 | 841149 | 3 | 36 | 2 | 6 | 2 | | | | 0.6 | 73 | 5 | 2 | 1 |
| | | | 841151 | 1 | 116 | 7 | 80 | 305 | 320 | | 12 | 2.1 | 3869 | 2 | 2 | 1 |
| | | | 841156 | 2 | 45 | 2 | 40 | 45 | | | | 0.2 | 1198 | 2 | 2 | 1 |
| | | | 841157 | 3 | 38 | 3 | 18 | 5 | | | | 0.1 | 87 | 2 | 2 | 1 |
| | | | 841159 | 3 | 40 | 7 | 13 | 3 | | | | 0.1 | 406 | 2 | 2 | 1 |
| | | | 841160 | 1 | 130 | 7 | 76 | 165 | | | | 1.2 | 20656 | 4 | 2 | 1 |
| | | | 841161 | 1 | 77 | 2 | 33 | 1410 | | | | 1.8 | 2800 | 2 | 2 | 1 |
| | | | 841182 | 2 | 38 | 4 | 6 | 34 | | | | 1.7 | 109 | 2 | 2 | 1 |
| | | | 841183 | 1 | 133 | 5 | 58 | 265 | | | | 1.5 | 1626 | 2 | 2 | 1 |
| 63K16-04 | 6082230 | 429013 | 841143 | 1 | 116 | 9 | 209 | 14 | | | | 0.2 | 28 | 2 | 2 | 2 |
| | | | 841144 | 2 | 152 | 12 | 93 | 10 | | | | 0.2 | 17 | 4 | 2 | 1 |
| | | | 841145 | 1 | 105 | 4 | 175 | 1 | | | | 0.1 | 24 | 2 | 2 | 2 |
| | | | 841150 | 1 | 163 | 7 | 216 | 10 | | | | 0.1 | 8 | 4 | 2 | 2 |
| 63K16-05 | 6082352 | 429822 | 841155 | 2 | 21 | 13 | 267 | 150 | | | | 0.1 | 424 | 2 | 2 | 1 |
| | | | 841168 | 3 | 32 | 10 | 9 | 174 | | | | 0.2 | 76 | 2 | 2 | 1 |
| | | | 841169 | 4 | 61 | 10 | 214 | 625 | 420 | | | 0.3 | 26 | 2 | 3 | 1 |
| | | | 841170 | 2 | 14 | 12 | 13 | 21 | | | | 0.2 | 33 | 5 | 2 | 1 |
| 63K16-06 | 6081595 | 429426 | 850225 | 2 | 18 | 4 | 75 | 11 | | | | 0.1 | 4 | 2 | 2 | 1 |
| | | | 850226 | 3 | 38 | 2 | 8 | 1 | | | | 0.1 | 3 | 2 | 2 | 1 |
| | | | 850227 | 3 | 87 | 224 | 207 | 5 | | | | 0.1 | 7 | 2 | 3 | 1 |
| | | | 850228 | 3 | 120 | 14 | 25 | 3 | | | | 0.1 | 8 | 2 | 2 | 1 |
| | | | 850239 | 45 | 34 | 2 | 6 | 18 | | | | 0.1 | 2 | 2 | 2 | 1 |
| 63K16-07 | 6082962 | 430602 | 850242 | 3 | 97 | 105 | 525 | 150 | 310 | | | 2.8 | 11 | 14 | 2 | 4 |
| | | | 850245 | 5 | 42 | 9 | 138 | 32 | | | | 0.3 | 10 | 3 | 2 | 1 |
| 63K16-08 | 6080498 | 430181 | 850244 | 1 | 178 | 5 | 10 | 1 | | | | 0.1 | 6 | 2 | 2 | 1 |
| 63K16-09 | 6082482 | 430659 | 850236 | 1 | 152 | 7 | 32 | 27 | | | | 0.2 | 16 | 2 | 2 | 1 |
| 63K16-10 | 6082572 | 432131 | 850221 | 2 | 201 | [illegible] | 14 | 375 | | | | 0.2 | 697 | 2 | 2 | 1 |
| | | | 850223 | 4 | 143 | 6 | 3 | 53 | | | | 0.6 | 301 | 2 | 2 | 1 |
| | | | 850224 | 2 | 160 | 8 | 37 | 3290 | 3100 | 20 | 12 | 0.1 | 1197 | 3 | 2 | 1 |
| | | | 850222 | 3 | 137 | 9 | 20 | 60 | | | | 0.3 | 404 | 2 | 2 | 1 |
| 63K16-11 | 6082929 | 431496 | 850230 | 2 | 186 | 4 | 32 | 164 | | | | 0.3 | 549 | 2 | 2 | 1 |
| | | | 850231 | 2 | 139 | 10 | 32 | 4250 | 3900 | 10 | 14 | 0.7 | 1356 | 4 | 2 | 1 |
| 63K16-12 | 6084496 | 434019 | 850241 | 1 | 82 | 2 | 14 | 2 | | | | 0.1 | 12 | 2 | 2 | 1 |
| 63K16-13 | 6084240 | 433649 | | | | | | | | | | | | | | |
| | SITE | A | 850217 | 3 | 33 | 2 | 4 | 4 | | | | 0.2 | 64 | 2 | 2 | 1 |
| | | | 850218 | 2 | 104 | 2 | 35 | 58 | | | | 0.1 | 341 | 2 | 2 | 1 |
| | | | 850219 | 2 | 93 | 10 | 253 | 1090 | 1300 | | 8 | 0.2 | 2908 | 2 | 2 | 1 |
| | | | 850220 | 3 | 120 | 6 | 57 | 305 | 360 | | 14 | 0.1 | 516 | 2 | 2 | 1 |
| | SITE | B | 850250 | 2 | 156 | 8 | 39 | 8090 | | | | 0.5 | 8131 | 3 | 2 | 1 |
| | | | 850251 | 2 | 118 | 5 | 42 | 1360 | | | | 0.1 | 3075 | 2 | 2 | 1 |
| | | | 850252 | 1 | 148 | 2 | 36 | 48 | | | | 0.1 | 225 | 2 | 2 | 1 |
| | | | 850253 | 2 | 198 | 4 | 16 | 11350 | 11000 | | 18 | 0.5 | 2466 | 2 | 2 | 1 |
| | | | 850254 | 1 | 202 | 7 | 38 | 8960 | | | | 0.3 | 5514 | 2 | 2 | 1 |
| | SITE | C | 850266 | 1 | 103 | 6 | 29 | 43 | | | | 0.1 | 27659 | 2 | 2 | 1 |
| | | | 850267 | 3 | 28 | 2 | 2 | 44 | | | | 0.1 | 254 | 2 | 2 | 1 |
| | | | 850268 | 2 | 40 | 3 | 20 | 1990 | 1800 | | | 0.1 | 2934 | 2 | 2 | 1 |
| | | | 850269 | 2 | 44 | 2 | 20 | 195 | | | | 0.1 | 405 | 2 | 2 | 1 |
| | | | 850270 | 3 | 37 | 2 | 9 | 245 | | | | 0.1 | 960 | 2 | 2 | 1 |

| Mineral Occurrence | UTM Coordinates Northing | Easting | Sample Numbers | Mo (ppm) | Cu (ppm) | Pb (ppm) | Zn (ppm) | Au1 (ppb) | Au2 (ppb) | Pt (ppb) | Pd (ppb) | Ag (ppm) | As (ppm) | Sb (ppm) | Bi (ppm) | Cd (ppm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SITE | D | 850246 | 2 | 37 | 3 | 7 | 5250 | 3600 | | | 0.2 | 656 | 2 | 2 | 1 |
| | | | 850247 | 2 | 42 | 2 | 14 | 825 | | | | 0.1 | 26 | 2 | 2 | 1 |
| | | | 850248 | 3 | 43 | 2 | 34 | 11 | | | | 0.1 | 23 | 2 | 2 | 1 |
| | | | 850249 | 2 | 70 | 8 | 29 | 650 | | | | 0.1 | 1833 | 3 | 2 | 1 |
| | SITE | E | 850255 | 3 | 29 | 4 | 5 | 32 | | | | 0.1 | 18 | 2 | 2 | 1 |
| | | | 850256 | 1 | 182 | 3 | 29 | 185 | 400 | 10 | 20 | 0.1 | 409 | 2 | 2 | 1 |
| | | | 850257 | 11 | 353 | 9 | 97 | 4 | | | | 0.1 | 67 | 2 | 2 | 1 |
| | | | 850259 | 3 | 39 | 2 | 5 | 7 | | | | 0.1 | 29 | 2 | 2 | 1 |
| | | | 850260 | 3 | 28 | 2 | 4 | 2 | | | | 0.1 | 4 | 2 | 2 | 1 |
| | SITE | F | 850258 | 1 | 131 | 3 | 17 | 195 | | | | 0.1 | 7394 | 2 | 2 | 1 |
| 63K16-17 | 6079791 | 433563 | 850237 | 1 | 173 | 12 | 42 | 5 | | | | 0.1 | 937 | 2 | 2 | 1 |
| | | | 850238 | 3 | 54 | 6 | 3 | 3 | | | | 0.1 | 11 | 3 | 2 | 1 |
| 63K16-18 | 6079750 | 432891 | 850261 | 3 | 162 | 10 | 17 | 24 | | | | 0.2 | 127 | 2 | 2 | 1 |
| | | | 850262 | 1 | 226 | 33 | 94 | 95 | | | | 2.9 | 85 | 2 | 2 | 1 |
| | | | 850263 | 2 | 51 | 5 | 21 | 51 | | | | 7.7 | 10 | 6 | 2 | 1 |
| | | | 850264 | 2 | 41 | 14 | 53 | 1850 | | | | 2.5 | 16769 | 3 | 2 | 1 |
| | | | 850265 | 4 | 42 | 2 | 29 | 350 | | | | 0.3 | 328 | 2 | 2 | 1 |
| 63K16-19 | 6068916 | 434652 | 860618 | 8 | 136 | 153 | 263 | 1 | | | | 0.9 | 84 | 11 | 2 | 1 |
| | | | 860619 | 6 | 181 | 23 | 14 | 2 | | | | 0.2 | 1250 | 9 | 2 | 1 |
| | | | 860620 | 4 | 226 | 27 | 59 | 1 | | | | 0.1 | 36 | 2 | 2 | 1 |
| 63K16-20 | 6076349 | 434500 | 852989 | 1 | 82 | 5 | 28 | 1 | | | | 0.2 | 11 | 3 | 2 | 1 |
| | | | 852990 | 2 | 151 | 13 | 105 | 4 | | | | 0.3 | 9 | 3 | 2 | 1 |
| | | | 852993 | 22 | 3212 | 6 | 83 | 124 | | | | 0.7 | 2 | 2 | 2 | 1 |
| | | | 853025 | 31 | 12497 | 4 | 57 | 485 | | | | 1.5 | 5 | 2 | 2 | 1 |
| | | | 853026 | 2 | 52 | 9 | 61 | 2 | | | | 0.1 | 3 | 2 | 5 | 1 |
| | | | 853027 | 2 | 270 | 4 | 64 | 495 | | | | 0.2 | 7 | 2 | 2 | 1 |
| 63K16-21 | 6070652 | 418740 | 860741 | 95 | 313 | 27 | 4410 | 30 | | | | 1.8 | 4 | 2 | 2 | 37 |
| | | | 860742 | 26 | 139 | 276 | 516 | 124 | 100 | | | 2.1 | 12 | 2 | 2 | 1 |
| 63K16-22 | 6068858 | 421843 | 853866 | 6 | 262 | 23 | 5337 | 169000 | 8200 | | | 165.8 | 6 | 2 | 2 | 64 |
| 63K16-26 | 6072304 | 433987 | 861101 | 2 | 95 | 4 | 45 | 1 | | | | 0.1 | 3 | 2 | 2 | 1 |
| | | | 861102 | 1 | 125 | 2 | 22 | 1 | | | | 0.1 | 3 | 2 | 2 | 1 |
| | | | 861103 | 1 | 150 | 2 | 19 | 4 | | | | 0.1 | 2 | 2 | 2 | 1 |
| | | | 861104 | 2 | 64 | 4 | 37 | 1 | | | | 0.1 | 3 | 5 | 2 | 1 |
| | | | 861105 | 2 | 188 | 3 | 34 | 1 | | | | 0.1 | 4 | 2 | 2 | 1 |
| | | | 861106 | 2 | 231 | 2 | 18 | 5 | | | | 0.1 | 5 | 3 | 2 | 1 |
| 63K16-27 | 6073502 | 428725 | 861118 | 2 | 57 | 2 | 9 | 155 | | | | 0.1 | 2 | 2 | 2 | 1 |
| | | | 861119 | 2 | 50 | 2 | 17 | 47 | | | | 0.1 | 4 | 2 | 2 | 1 |
| | | | 861120 | 2 | 28 | 3 | 839 | 3 | | | | 0.1 | 2 | 2 | 3 | 2 |
| | | | 861121 | 3 | 68 | 2 | 199 | 2820 | | | | 0.3 | 4 | 2 | 2 | 2 |
| | | | 861122 | 1 | 70 | 3 | 94 | 18 | | | | 0.1 | 2 | 2 | 2 | 1 |
| | | | 861123 | 2 | 38 | 47 | 4 | 6650 | 9000 | | | 0.2 | 5 | 2 | 3 | 1 |
| | | | 861124 | 3 | 30 | 2 | 5 | 28 | | | | 0.1 | 2 | 2 | 2 | 1 |
| | | | 861125 | 5 | 77 | 3 | 590 | 185 | | | | 0.1 | 3 | 3 | 2 | 2 |
| | | | 861501 | 1 | 16 | 2 | 21 | 4 | | | | 0.1 | 4 | 2 | 2 | 1 |
| 63K16-28 | 6074837 | 435335 | 861506 | 2 | 46 | 2 | 3 | 1 | | | | 0.1 | 3 | 2 | 2 | 1 |
| | | | 861507 | 2 | 228 | 3 | 37 | 3 | | | | 0.2 | 2 | 2 | 2 | 1 |
| 63K16-29 | 6081293 | 434893 | 861509 | 4 | 135 | 13 | 43 | 7920 | 7600 | | 12 | 0.6 | 18595 | 22 | 2 | 1 |
| | | | 861510 | 7 | 186 | 15 | 17 | 6150 | | | | 0.2 | 12250 | 16 | 2 | 1 |
| | | | 861511 | 3 | 143 | 5 | 38 | 580 | | | | 0.2 | 1774 | 2 | 2 | 1 |
| | | | 861512 | 2 | 100 | 2 | 106 | 3 | | | | 0.1 | 29 | 2 | 2 | 1 |
| | | | 861513 | 2 | 112 | 4 | 52 | 1 | | | | 0.2 | 2 | 2 | 2 | 1 |
| | | | 861517 | 7 | 234 | 17 | 21 | 785 | | | | 0.3 | 2095 | 4 | 2 | 1 |
| 63K16-30 | 6074442 | 430425 | 861519 | 2 | 119 | 5 | 61 | 2 | | | | 0.1 | 4 | 2 | 2 | 1 |
| | | | 861520 | 1 | 115 | 4 | 69 | 3 | | | | 0.1 | 13 | 2 | 2 | 1 |
| | | | 861521 | 2 | 129 | 2 | 17 | 2 | | | | 0.1 | 2 | 2 | 2 | 1 |
| 63K16-31 | 6076883 | 431499 | 861701 | 3 | 56 | 4 | 52 | 18 | | | | 0.1 | 86 | 2 | 2 | 1 |
| | | | 861702 | 2 | 56 | 6 | 62 | 59 | | | | 0.2 | 8 | 2 | 2 | 1 |
| | | | 861703 | 3 | 121 | 5 | 40 | 12 | | | | 0.1 | 15 | 2 | 2 | 1 |
| | | | 861704 | 3 | 47 | 17 | 78 | 1620 | 1900 | | | 1.6 | 10 | 4 | 11 | 1 |
| | | | 861705 | 3 | 67 | 14 | 78 | 645 | | | | 0.2 | 38 | 3 | 3 | 1 |
| 63K16-34 | 6076214 | 428729 | 861694 | 2 | 293 | 35 | 437 | 35 | | | | 1.5 | 41 | 2 | 2 | 1 |
| | | | 861695 | 2 | 311 | 40 | 506 | 30 | | | | 1.8 | 47 | 2 | 2 | 1 |
| 63K16-35 | 6076369 | 429117 | 861694 | 2 | 293 | 35 | 437 | 35 | | | | 1.5 | 41 | 2 | 2 | 1 |
| | | | 861695 | 2 | 311 | 40 | 506 | 30 | | | | 1.8 | 47 | 2 | 2 | 1 |
| 63K16-36 | 6092016 | 406060 | 658423 | 15 | 769 | 29 | 1700 | 10 | | | | 1.8 | 48 | 2 | 2 | 8 |
| | | | 658425 | 6 | 73 | 215 | 284 | 1 | | | | 0.2 | 5 | 2 | 2 | 1 |
| 63K16-37 | 6091918 | 406117 | 65843 | 10 | 709 | 99 | 1856 | 1 | | | | 1.6 | 25 | 5 | 2 | 7 |

| Mineral Occurrence | UTM Coordinates Northing | Easting | Sample Numbers | Mo (ppm) | Cu (ppm) | Pb (ppm) | Zn (ppm) | Au1 (ppb) | Au2 (ppb) | Pt (ppb) | Pd (ppb) | Ag (ppm) | As (ppm) | Sb (ppm) | Bi (ppm) | Cd (ppm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 65845 | 12 | 805 | 35 | 1888 | 6 | | | | 1.9 | 23 | 2 | 2 | 8 |
| | | | 65846 | 11 | 946 | 30 | 1777 | 1 | | | | 1.4 | 18 | 2 | 2 | 8 |
| | | | 65849 | 9 | 218 | 41 | 850 | 1 | | | | 0.1 | 2 | 2 | 2 | 3 |
| 63K16-38 | 6088327 | 403970 | 658411 | 3 | 54 | 4 | 17 | 1 | | | | 0.1 | 3 | 2 | 2 | 1 |
| | | | 658412 | 3 | 291 | 9 | 24 | 6 | | | | 0.3 | 18 | 2 | 2 | 1 |
| | | | 658414 | 2 | 21 | 5 | 15 | 1 | | | | 0.1 | 4 | 2 | 2 | 1 |
| 63K16-39 | 6088667 | 404236 | 658416E | 10 | 97 | 15 | 362 | 520 | | | | 0.2 | 52 | 2 | 2 | 2 |
| 63K16-40 | 6087862 | 405610 | 658491 | 11 | 215 | 31 | 190 | 1 | | | | 0.6 | 30 | 2 | 4 | 3 |
| 63K16-41 | 6087000 | 406207 | 658420 | 6 | 48 | 4 | 12 | 1920 | | | | 0.1 | 1131 | 2 | 2 | 1 |
| 63K16-42 | 6086903 | 407074 | 658422 | 3 | 60 | 6 | 11 | 165 | | | | 0.1 | 900 | 2 | 2 | 1 |
| 63K16-43 | 6086846 | 406842 | 658489 | 7 | 46 | 4 | 5 | 115 | | | | 0.1 | 504 | 2 | 2 | 1 |
| 63K16-44 | 6082440 | 407276 | 658447 | 5 | 927 | 2 | 29 | 1 | | | | 0.1 | 8 | 2 | 3 | 1 |
| 63K16-45 | 6082325 | 407221 | 658440 | 8 | 509 | 13 | 43 | 6 | | | | 0.1 | 46 | 2 | 2 | 3 |
| | | | 658441 | 6 | 666 | 14 | 38 | 2 | | | | 0.1 | 30 | 2 | 2 | 2 |
| 63K16-46 | 6078036 | 407538 | 658449 | 14 | 110 | 59 | 83 | 1 | | | | 0.2 | 10 | 2 | 2 | 1 |
| 63K16-47 | 6078079 | 407847 | 658437A | 6 | 702 | 24 | 45 | 16 | | | | 0.2 | 18 | 2 | 2 | 1 |
| | | | 658437B | 3 | 37 | 2 | 93 | 1 | | | | 0.1 | 5 | 2 | 2 | 1 |
| 63K16-48 | 608 '084 | 409776 | 658496 | 4 | 160 | 7 | 29 | 425 | | | | 0.1 | 924 | 2 | 3 | 1 |
| 63K16-49 | 6081330 | 405595 | 658457A | 10 | 1110 | 42 | 1823 | 8 | | | | 1.9 | 30 | 2 | 2 | 7 |
| 63K16-50 | 6080493 | 405356 | 658428A | 3 | 515 | 39 | 45 | 14 | | | | 0.2 | 26 | 2 | 2 | 4 |
| 63K16-51 | 6080383 | 405335 | 658428B | 4 | 802 | 54 | 277 | 82 | | | | 0.9 | 248 | 2 | 2 | 5 |
| 63K16-52 | 6080664 | 406924 | 658435 | 6 | 4274 | 34 | 78 | 41 | | | | 0.1 | 86 | 2 | 2 | 1 |
| 63K16-53 | 6080205 | 406828 | 658455 | 5 | 159 | 375 | 34 | 1 | | | | 0.1 | 12 | 2 | 2 | 1 |
| 63K16-55 | 6085293 | 407515 | 658478 | 16 | 91 | 8 | 143 | 22 | | | | 0.2 | 739 | 2 | 2 | 1 |
| | | | 658482 | 22 | 174 | 12 | 127 | 16 | | | | 0.3 | 42 | 2 | 2 | 1 |
| | | | 658484 | 4 | 48 | 3 | 77 | 4 | | | | 0.1 | 48 | 2 | 2 | 1 |
| | | | 658485 | 20 | 107 | 14 | 121 | 2 | | | | 0.2 | 21 | 2 | 2 | 1 |
| 63K16-56 | 6085928 | 406918 | 658463 | 13 | 515 | 31 | 104 | 14 | | | | 0.3 | 25 | 2 | 2 | 4 |
| 63K16-57 | 6085846 | 406897 | 658470 | 10 | 564 | 7 | 98 | 8 | | | | 0.1 | 18 | 2 | 2 | 1 |

| Mineral Occurrence | UTM Coordinates Northing | Easting | Sample Numbers | Ni (ppm) | Co (ppm) | Fe (%) | Mn (ppm) | Ba (ppm) | B (ppm) | Cr (ppm) | Mg (%) | W (ppm) | U (ppm) | Th (ppm) | P (%) | La (ppm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 63K16-01 | 6086569 | 434664 | 841140 | 41 | 11 | 4.07 | 303 | 81 | 7 | 95 | 0.77 | 8 | 5 | 5 | 0.048 | 23 |
| | | | 841141 | 118 | 33 | 9.69 | 386 | 16 | 10 | 171 | 1.02 | 1 | 5 | 6 | 0.009 | 20 |
| | | | 841142 | 39 | 11 | 3.68 | 256 | 316 | 3 | 93 | 0.81 | 11 | 5 | 4 | 0.039 | 20 |
| | | | 852995 | 38 | 11 | 3.42 | 306 | 245 | 2 | 79 | 0.77 | 1 | 5 | 5 | 0.043 | 19 |
| | | | 852996 | 42 | 12 | 4.16 | 249 | 184 | 3 | 131 | 0.77 | 1 | 5 | 8 | 0.054 | 28 |
| | | | 852997 | 38 | 11 | 3.62 | 222 | 240 | 2 | 107 | 0.72 | 1 | 5 | 5 | 0.044 | 22 |
| | | | 852998 | 48 | 14 | 4.49 | 312 | 622 | 2 | 172 | 1.11 | 1 | 5 | 6 | 0.063 | 26 |
| | | | 852999 | 36 | 10 | 3.61 | 214 | 327 | 8 | 113 | 0.75 | 1 | 5 | 5 | 0.041 | 21 |
| | | | 853000 | 42 | 12 | 4.47 | 235 | 248 | 2 | 143 | 0.76 | 1 | 5 | 7 | 0.050 | 27 |
| | | | 853001 | 83 | 26 | 7.15 | 420 | 114 | 5 | 203 | 1.32 | 4 | 6 | 8 | 0.063 | 24 |
| | | | 853002 | 36 | 10 | 3.41 | 314 | 374 | 2 | 93 | 0.80 | 1 | 5 | 5 | 0.040 | 20 |
| | | | 853003 | 45 | 12 | 4.24 | 180 | 501 | 2 | 164 | 1.02 | 1 | 5 | 6 | 0.060 | 24 |
| | | | 853008 | 56 | 17 | 4.03 | 335 | 285 | 2 | 109 | 0.92 | 1 | 5 | 6 | 0.031 | 21 |
| | | | 853012 | 44 | 12 | 3.87 | 181 | 436 | 2 | 153 | 0.94 | 1 | 5 | 6 | 0.054 | 19 |
| | | | 853013 | 38 | 11 | 3.78 | 255 | 282 | 2 | 115 | 0.72 | 1 | 5 | 5 | 0.046 | 19 |
| | | | 853014 | 35 | 9 | 2.45 | 140 | 55 | 2 | 39 | 0.19 | 1 | 5 | 2 | 0.007 | 9 |
| 63K16-02 | 6084045 | 434480 | 850233 | 69 | 22 | 2.16 | 328 | 35 | 6 | 142 | 0.62 | 3 | 9 | 4 | 0.067 | 6 |
| | | | 850234 | 42 | 31 | 4.55 | 317 | 7 | 2 | 24 | 0.56 | 1 | 5 | 4 | 0.067 | 7 |
| | | | 850235 | 59 | 39 | 1.84 | 287 | 27 | 14 | 33 | 0.61 | 5 | 5 | 4 | 0.113 | 7 |
| 63K16-03 | 6083919 | 428509 | 841149 | 14 | 2 | 1.40 | 124 | 1 | 2 | 16 | 0.05 | 38 | 5 | 1 | 0.003 | 2 |
| | | | 841151 | 35 | 31 | 3.86 | 568 | 46 | 18 | 124 | 1.29 | 9 | 5 | 1 | 0.027 | 2 |
| | | | 841156 | 15 | 3 | 1.93 | 158 | 7 | 3 | 24 | 0.44 | 5 | 5 | 1 | 0.007 | 2 |
| | | | 841157 | 17 | 3 | 1.79 | 137 | 6 | 2 | 26 | 0.17 | 5 | 6 | 1 | 0.007 | 2 |
| | | | 841159 | 17 | 3 | 1.76 | 150 | 6 | 2 | 21 | 0.19 | 976 | 5 | 1 | 0.008 | 2 |
| | | | 841160 | 28 | 32 | 5.20 | 731 | 117 | 36 | 101 | 2.38 | 4 | 5 | 1 | 0.022 | 2 |
| | | | 841161 | 13 | 14 | 3.02 | 862 | 54 | 3 | 46 | 1.04 | 10 | 5 | 1 | 0.024 | 2 |
| | | | 841182 | 14 | 2 | 1.41 | 106 | 1 | 2 | 17 | 0.04 | 394 | 5 | 1 | 0.003 | 2 |
| | | | 841183 | 35 | 29 | 5.22 | 508 | 68 | 2 | 50 | 1.38 | 10 | 5 | 1 | 0.037 | 2 |
| 63K16-04 | 6082230 | 429013 | 841143 | 32 | 23 | 2.47 | 179 | 66 | 59 | 44 | 2.50 | 1 | 5 | 1 | 0.042 | 2 |
| | | | 841144 | 25 | 19 | 3.69 | 161 | 57 | 64 | 40 | 2.12 | 2 | 5 | 1 | 0.009 | 2 |
| | | | 841145 | 33 | 29 | 2.61 | 168 | 69 | 84 | 78 | 2.67 | 2 | 5 | 1 | 0.057 | 3 |
| | | | 841150 | 29 | 27 | 3.25 | 625 | 25 | 28 | 24 | 5.05 | 3 | 5 | 1 | 0.026 | 5 |
| 63K16-05 | 6082352 | 429822 | 841155 | 9 | 1 | 2.61 | 170 | 2 | 5 | 6 | 0.76 | 1 | 5 | 1 | 0.090 | 2 |
| | | | 841168 | 14 | 2 | 2.65 | 133 | 1 | 2 | 14 | 0.16 | 1 | 5 | 1 | 0.057 | 2 |
| | | | 841169 | 20 | 2 | 3.38 | 126 | 2 | 2 | 19 | 0.09 | 1 | 5 | 1 | 0.031 | 2 |
| | | | 841170 | 6 | 3 | 6.25 | 967 | 2 | 6 | 4 | 3.41 | 2 | 5 | 3 | 0.116 | 3 |
| 63K16-06 | 6081595 | 429426 | 850225 | 7 | 11 | 5.99 | 779 | 239 | 2 | 8 | 0.86 | 5 | 5 | 3 | 0.086 | 8 |
| | | | 850226 | 16 | 2 | 1.70 | 127 | 1 | 2 | 15 | 0.03 | 1 | 5 | 1 | 0.020 | 2 |
| | | | 850227 | 17 | 2 | 2.19 | 174 | 158 | 2 | 20 | 0.12 | 2 | 5 | 1 | 0.007 | 2 |
| | | | 850228 | 17 | 5 | 2.15 | 152 | 23 | 2 | 19 | 0.18 | 3 | 5 | 1 | 0.007 | 2 |
| | | | 850239 | 14 | 6 | 2.27 | 128 | 13 | 2 | 15 | 0.15 | 7 | 5 | 1 | 0.008 | 2 |
| 63K16-07 | 6082962 | 430602 | 850242 | 15 | 4 | 2.06 | 231 | 1 | 2 | 14 | 0.88 | 4 | 5 | 1 | 0.009 | 2 |
| | | | 850245 | 18 | 5 | 2.00 | 165 | 6 | 2 | 19 | 0.23 | 2 | 5 | 1 | 0.005 | 2 |
| 63K16-08 | 6080498 | 430181 | 850244 | 25 | 24 | 3.25 | 203 | 8 | 2 | 16 | 0.53 | 1 | 5 | 1 | 0.036 | 2 |
| 63K16-09 | 6082482 | 430659 | 850236 | 43 | 18 | 2.81 | 432 | 127 | 2 | 57 | 1.27 | 3 | 5 | 2 | 0.031 | 2 |
| 63K16-10 | 6082572 | 432131 | 850221 | 85 | 31 | 4.78 | 403 | 10 | 5 | 42 | 1.14 | 16 | 5 | 2 | 0.059 | 2 |
| | | | 850223 | 74 | 19 | 7.10 | 145 | 1 | 2 | 19 | 0.02 | 114 | 5 | 1 | 0.004 | 2 |
| | | | 850224 | 74 | 33 | 4.96 | 778 | 73 | 8 | 53 | 2.91 | 112 | 5 | 3 | 0.012 | 2 |
| | | | 850222 | 88 | 30 | 4.42 | 385 | 9 | 9 | 40 | 1.11 | 2 | 5 | 2 | 0.033 | 2 |
| 63K16-11 | 6082929 | 431496 | 850230 | 84 | 36 | 4.85 | 417 | 9 | 5 | 53 | 1.60 | 3 | 5 | 2 | 0.035 | 2 |
| | | | 850231 | 78 | 32 | 6.57 | 552 | 10 | 3 | 72 | 1.63 | 7 | 5 | 2 | 0.031 | 2 |
| 63K16-12 | 6084496 | 434019 | 850241 | 21 | 8 | 1.30 | 210 | 13 | 5 | 27 | 0.42 | 1 | 5 | 1 | 0.035 | 2 |
| 63K16-13 | 6084240 | 433649 | | | | | | | | | | | | | | |
| | SITE | A | 850217 | 15 | 2 | 1.45 | 120 | 1 | 2 | 18 | 0.03 | 2 | 5 | 1 | 0.004 | 2 |
| | | | 850218 | 54 | 22 | 3.57 | 431 | 96 | 3 | 65 | 2.03 | 11 | 5 | 2 | 0.032 | 3 |
| | | | 850219 | 72 | 26 | 4.98 | 634 | 111 | 2 | 91 | 2.38 | 7 | 5 | 2 | 0.041 | 2 |
| | | | 850220 | 73 | 26 | 3.51 | 518 | 140 | 2 | 116 | 1.63 | 23 | 5 | 2 | 0.061 | 3 |
| | SITE | B | 850250 | 89 | 29 | 6.20 | 1038 | 44 | 2 | 79 | 3.70 | 41 | 5 | 1 | 0.006 | 2 |
| | | | 850251 | 89 | 29 | 4.71 | 668 | 84 | 2 | 135 | 3.82 | 7 | 12 | 1 | 0.014 | 2 |
| | | | 850252 | 76 | 30 | 3.71 | 529 | 125 | 2 | 109 | 1.79 | 6 | 5 | 1 | 0.025 | 2 |
| | | | 850253 | 106 | 36 | 3.83 | 502 | 4 | 2 | 39 | 1.26 | 33 | 5 | 1 | 0.014 | 2 |
| | | | 850254 | 99 | 32 | 5.99 | 830 | 61 | 2 | 118 | 3.04 | 54 | 9 | 1 | 0.004 | 2 |
| | SITE | C | 850266 | 118 | 46 | 5.51 | 777 | 44 | 11 | 40 | 2.08 | 4 | 10 | 1 | 0.013 | 2 |
| | | | 850267 | 13 | 2 | 1.28 | 109 | 1 | 4 | 13 | 0.03 | 1 | 5 | 1 | 0.002 | 2 |
| | | | 850268 | 20 | 9 | 2.68 | 397 | 27 | 6 | 30 | 1.11 | 34 | 5 | 1 | 0.036 | 2 |
| | | | 850269 | 57 | 27 | 2.42 | 450 | 7 | 4 | 43 | 0.93 | 3 | 5 | 1 | 0.026 | 2 |
| | | | 850270 | 22 | 3 | 1.88 | 141 | 7 | 3 | 27 | 0.16 | 1 | 5 | 1 | 0.003 | 2 |

| Mineral Occurrence | UTM Coordinates Northing | Easting | Sample Numbers | Ni (ppm) | Co (ppm) | Fe (%) | Mn (ppm) | Ba (ppm) | B (ppm) | Cr (ppm) | Mg (%) | W (ppm) | U (ppm) | Th (ppm) | P (%) | La (ppm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SITE | D | 850246 | 17 | 3 | 1.52 | 186 | 4 | 2 | 19 | 0.15 | 7 | 5 | 1 | 0.004 | 2 |
| | | | 850247 | 20 | 4 | 1.80 | 256 | 26 | 2 | 26 | 0.52 | 5 | 5 | 1 | 0.009 | 2 |
| | | | 850248 | 22 | 4 | 1.59 | 117 | 1 | 3 | 17 | 0.06 | 3 | 8 | 1 | 0.002 | 2 |
| | | | 850249 | 68 | 27 | 4.31 | 778 | 155 | 8 | 100 | 2.70 | 26 | 5 | 4 | 0.008 | 2 |
| | SITE | E | 850255 | 13 | 2 | 1.37 | 100 | 3 | 6 | 15 | 0.05 | 1 | 5 | 1 | 0.002 | 2 |
| | | | 850256 | 78 | 30 | 3.03 | 505 | 211 | 2 | 43 | 0.98 | 2 | 5 | 1 | 0.027 | 2 |
| | | | 850257 | 45 | 19 | 7.17 | 291 | 24 | 21 | 32 | 1.70 | 1 | 5 | 3 | 0.099 | 13 |
| | | | 850259 | 17 | 2 | 1.67 | 185 | 1 | 3 | 18 | 0.10 | 2 | 5 | 1 | 0.007 | 2 |
| | | | 850260 | 13 | 1 | 1.31 | 98 | 4 | 3 | 13 | 0.03 | 1 | 5 | 1 | 0.002 | 2 |
| | SITE | F | 850258 | 75 | 30 | 3.08 | 611 | 27 | 8 | 41 | 2.63 | 9 | 5 | 1 | 0.030 | 2 |
| 63K16-17 | 6079791 | 433563 | 850237 | 83 | 40 | 4.61 | 657 | 76 | 21 | 84 | 2.62 | 5 | 5 | 2 | 0.031 | 2 |
| | | | 850238 | 23 | 5 | 1.86 | 90 | 7 | 2 | 16 | 0.07 | 1 | 5 | 1 | 0.007 | 2 |
| 63K16-18 | 6079750 | 432891 | 850261 | 95 | 34 | 6.30 | 321 | 11 | 5 | 51 | 0.60 | 1 | 5 | 1 | 0.024 | 2 |
| | | | 850262 | 83 | 29 | 5.56 | 500 | 144 | 8 | 105 | 2.93 | 26 | 5 | 1 | 0.021 | 2 |
| | | | 850263 | 13 | 3 | 1.36 | 155 | 2 | 2 | 13 | 0.17 | 2 | 5 | 1 | 0.004 | 2 |
| | | | 850264 | 61 | 27 | 5.92 | 944 | 69 | 14 | 105 | 2.83 | 18 | 5 | 1 | 0.013 | 2 |
| | | | 850265 | 18 | 3 | 1.75 | 168 | 2 | 5 | 19 | 0.14 | 3 | 5 | 1 | 0.004 | 2 |
| 63K16-19 | 6068916 | 434652 | 860618 | 86 | 22 | 6.51 | 276 | 25 | 20 | 33 | 0.75 | 1 | 5 | 1 | 0.197 | 2 |
| | | | 860619 | 29 | 36 | 8.98 | 299 | 17 | 9 | 27 | 0.19 | 3 | 5 | 1 | 0.180 | 2 |
| | | | 860620 | 50 | 29 | 5.81 | 536 | 187 | 5 | 26 | 2.19 | 1 | 5 | 1 | 0.117 | 2 |
| 63K16-20 | 6076349 | 434500 | 852989 | 10 | 6 | 2.05 | 259 | 8 | 2 | 16 | 0.63 | 1 | 5 | 1 | 0.032 | 3 |
| | | | 852990 | 15 | 23 | 8.35 | 291 | 86 | 2 | 22 | 1.48 | 1 | 5 | 1 | 0.011 | 4 |
| | | | 852993 | 17 | 62 | 9.07 | 465 | 12 | 2 | 21 | 1.76 | 1 | 7 | 2 | 0.028 | 23 |
| | | | 853025 | 20 | 69 | 7.39 | 365 | 12 | 5 | 17 | 0.99 | 1 | 5 | 1 | 0.018 | 26 |
| | | | 853026 | 12 | 6 | 2.74 | 149 | 58 | 2 | 13 | 0.47 | 53 | 5 | 1 | 0.013 | 3 |
| | | | 853027 | 11 | 13 | 4.61 | 201 | 102 | 10 | 16 | 0.83 | 3 | 5 | 1 | 0.014 | 2 |
| 63K16-21 | 6070652 | 418740 | 860741 | 178 | 22 | 22.58 | 524 | 12 | 16 | 102 | 0.63 | 1 | 11 | 5 | 0.094 | 15 |
| | | | 860742 | 110 | 17 | 9.06 | 604 | 37 | 23 | 54 | 1.60 | 1 | 5 | 4 | 0.140 | 18 |
| 63K16-22 | 6068858 | 421843 | 853866 | 13 | 18 | 4.41 | 122 | 33 | 6 | 12 | 0.14 | 1 | 5 | 1 | 0.001 | 2 |
| 63K16-26 | 6072304 | 433987 | 861101 | 15 | 18 | 4.92 | 413 | 135 | 6 | 14 | 1.26 | 1 | 5 | 1 | 0.033 | 2 |
| | | | 861102 | 20 | 10 | 2.67 | 280 | 13 | 4 | 24 | 1.00 | 1 | 5 | 1 | 0.023 | 2 |
| | | | 861103 | 17 | 12 | 2.35 | 219 | 2 | 3 | 16 | 0.86 | 1 | 5 | 1 | 0.020 | 2 |
| | | | 861104 | 28 | 22 | 3.88 | 481 | 25 | 10 | 38 | 2.37 | 49 | 6 | 1 | 0.017 | 2 |
| | | | 861105 | 24 | 17 | 3.41 | 351 | 6 | 7 | 31 | 1.75 | 1 | 5 | 1 | 0.026 | 2 |
| | | | 861106 | 15 | 9 | 2.29 | 225 | 3 | 5 | 13 | 0.86 | 1 | 5 | 1 | 0.021 | 2 |
| 63K16-27 | 6073502 | 428725 | 861118 | 14 | 2 | 1.66 | 87 | 1 | 4 | 17 | 0.03 | 2 | 5 | 1 | 0.001 | 2 |
| | | | 861119 | 11 | 26 | 1.31 | 92 | 3 | 2 | 10 | 0.10 | 363 | 5 | 1 | 0.002 | 2 |
| | | | 861120 | 10 | 2 | 3.87 | 495 | 108 | 2 | 14 | 0.33 | 1 | 5 | 4 | 0.013 | 27 |
| | | | 861121 | 15 | 2 | 1.94 | 104 | 7 | 2 | 20 | 0.08 | 5 | 5 | 1 | 0.004 | 2 |
| | | | 861122 | 14 | 25 | 5.48 | 639 | 126 | 2 | 20 | 2.11 | 26 | 5 | 1 | 0.020 | 2 |
| | | | 861123 | 13 | 1 | 1.50 | 64 | 1 | 2 | 15 | 0.01 | 289 | 5 | 1 | 0.003 | 2 |
| | | | 861124 | 11 | 30 | 1.21 | 48 | 1 | 2 | 11 | 0.10 | 420 | 5 | 1 | 0.004 | 2 |
| | | | 861125 | 8 | 10 | 3.82 | 771 | 174 | 3 | 9 | 0.22 | 102 | 5 | 5 | 0.015 | 21 |
| | | | 861501 | 3 | 8 | 3.14 | 309 | 248 | 6 | 3 | 0.67 | 51 | 5 | 1 | 0.015 | 3 |
| 63K16-28 | 6074837 | 435335 | 861506 | 14 | 2 | 1.92 | 72 | 1 | 2 | 15 | 0.02 | 1 | 5 | 1 | 0.006 | 2 |
| | | | 861507 | 9 | 15 | 3.55 | 439 | 247 | 2 | 9 | 0.36 | 46 | 5 | 2 | 0.042 | 3 |
| 63K16-29 | 6081293 | 434893 | 861509 | 22 | 20 | 7.57 | 1260 | 3 | 4 | 37 | 2.21 | 9 | 5 | 2 | 0.014 | 2 |
| | | | 861510 | 68 | 23 | 8.73 | 564 | 25 | 13 | 128 | 2.31 | 1 | 5 | 1 | 0.022 | 4 |
| | | | 861511 | 21 | 18 | 4.71 | 641 | 39 | 5 | 28 | 1.51 | 19 | 5 | 2 | 0.033 | 2 |
| | | | 861512 | 20 | 22 | 4.12 | 794 | 89 | 4 | 34 | 0.93 | 1 | 5 | 2 | 0.030 | 7 |
| | | | 861513 | 32 | 16 | 3.64 | 241 | 83 | 3 | 11 | 1.11 | 1 | 5 | 5 | 0.135 | 16 |
| | | | 861517 | 107 | 16 | 8.49 | 399 | 10 | 4 | 42 | 1.38 | 2 | 5 | 1 | 0.024 | 3 |
| 63K16-30 | 6074442 | 430425 | 861519 | 9 | 13 | 5.14 | 377 | 256 | 2 | 6 | 1.00 | 1 | 5 | 5 | 0.079 | 18 |
| | | | 861520 | 11 | 16 | 4.29 | 281 | 617 | 2 | 9 | 0.95 | 35 | 5 | 4 | 0.060 | 13 |
| | | | 861521 | 9 | 5 | 1.88 | 349 | 5 | 4 | 10 | 0.35 | 2 | 5 | 3 | 0.041 | 14 |
| 63K16-31 | 6076883 | 431499 | 861701 | 9 | 10 | 3.69 | 540 | 17 | 5 | 8 | 0.52 | 3 | 5 | 8 | 0.180 | 39 |
| | | | 861702 | 19 | 11 | 4.85 | 499 | 370 | 11 | 32 | 1.09 | 1 | 5 | 6 | 0.070 | 21 |
| | | | 861703 | 17 | 4 | 2.55 | 220 | 11 | 2 | 18 | 0.31 | 4 | 5 | 1 | 0.016 | 3 |
| | | | 861704 | 17 | 2 | 2.00 | 99 | 3 | 2 | 19 | 0.10 | 1 | 5 | 1 | 0.009 | 2 |
| | | | 861705 | 18 | 3 | 2.13 | 97 | 5 | 2 | 18 | 0.10 | 2 | 5 | 1 | 0.005 | 2 |
| 63K16-34 | 6076214 | 428729 | 861694 | 17 | 13 | 5.55 | 265 | 76 | 4 | 11 | 1.01 | 1 | 5 | 7 | 0.031 | 30 |
| | | | 861695 | 20 | 14 | 5.56 | 254 | 68 | 5 | 12 | 0.9 | 1 | 5 | 8 | 0.031 | 37 |
| 63K16-35 | 6076369 | 429117 | 861694 | 17 | 13 | 5.55 | 265 | 76 | 4 | 11 | 1.01 | 1 | 5 | 7 | 0.031 | 30 |
| | | | 861695 | 20 | 14 | 5.56 | 254 | 68 | 5 | 12 | 0.9 | 1 | 5 | 8 | 0.031 | 37 |
| 63K16-36 | 6092016 | 406060 | 658423 | 373 | 35 | 30.86 | 503 | 6 | 19 | 15 | 0.10 | 1 | 5 | 1 | 0.140 | 39 |
| | | | 658425 | 43 | 8 | 3.79 | 183 | 1 | 2 | 28 | 0.01 | 1 | 5 | 1 | 0.020 | 2 |
| 63K16-37 | 6091918 | 406117 | 65843 | 350 | 35 | 29.68 | 560 | 6 | 17 | 13 | 0.11 | 1 | 5 | 1 | 0.120 | 46 |

| Mineral Occurrence | UTM Coordinates Northing | Easting | Sample Numbers | Ni (ppm) | Co (ppm) | Fe (%) | Mn (ppm) | Ba (ppm) | B (ppm) | Cr (ppm) | Mg (%) | W (ppm) | U (ppm) | Th (ppm) | P (%) | La (ppm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 65845 | 320 | 37 | 25.72 | 436 | 6 | 10 | 12 | 0.10 | 1 | 5 | 1 | 0.110 | 27 |
| | | | 65846 | 386 | 36 | 28.50 | 597 | 8 | 13 | 21 | 0.24 | 1 | 5 | 1 | 0.160 | 31 |
| | | | 65849 | 64 | 25 | 5.50 | 245 | 3 | 3 | 27 | 0.02 | 1 | 5 | 1 | 0.020 | 2 |
| 63K16-38 | 6088327 | 403970 | 658411 | 12 | 6 | 1.58 | 95 | 4 | 2 | 10 | 0.08 | 1 | 5 | 1 | 0.010 | 2 |
| | | | 658412 | 17 | 40 | 2.32 | 106 | 6 | 3 | 9 | 0.11 | 1 | 5 | 1 | 0.020 | 3 |
| | | | 658414 | 5 | 3 | 1.36 | 101 | 4 | 2 | 10 | 0.07 | 1 | 5 | 1 | 0.020 | 4 |
| 63K16-39 | 6088667 | 404236 | 658416E | 98 | 29 | 14.17 | 907 | 14 | 12 | 46 | 0.71 | 1 | 5 | 1 | 0.110 | 17 |
| 63K16-40 | 6087862 | 405610 | 658491 | 155 | 36 | 24.16 | 815 | 10 | 19 | 25 | 0.54 | 1 | 5 | 2 | 0.100 | 17 |
| 63K16-41 | 6087000 | 406207 | 658420 | 20 | 7 | 1.69 | 166 | 4 | 2 | 38 | 0.11 | 2 | 5 | 1 | 0.010 | 2 |
| 63K16-42 | 6086903 | 407074 | 658422 | 20 | 12 | 2.06 | 587 | 4 | 2 | 15 | 0.15 | 1 | 5 | 1 | 0.030 | 2 |
| 63K16-43 | 6086846 | 406842 | 658489 | 18 | 4 | 1.79 | 188 | 1 | 2 | 40 | 0.03 | 1 | 5 | 1 | 0.010 | 2 |
| 63K16-44 | 6082440 | 407276 | 658447 | 60 | 75 | 8.80 | 419 | 6 | 10 | 26 | 0.56 | 1 | 5 | 2 | 0.590 | 39 |
| 63K16-45 | 6082325 | 407221 | 658440 | 144 | 40 | 18.46 | 418 | 8 | 6 | 20 | 0.48 | 1 | 5 | 1 | 0.160 | 27 |
| | | | 658441 | 126 | 35 | 20.08 | 444 | 4 | 8 | 9 | 0.34 | 1 | 5 | 1 | 0.180 | 23 |
| 63K16-46 | 6078036 | 407538 | 658449 | 68 | 28 | 7.64 | 264 | 19 | 27 | 54 | 0.78 | 1 | 5 | 2 | 0.050 | 7 |
| 63K16-47 | 6078079 | 407847 | 658437A | 57 | 48 | 7.36 | 387 | 17 | 6 | 9 | 0.79 | 1 | 57 | 1 | 0.040 | 6 |
| | | | 658437B | 11 | 7 | 3.21 | 361 | 316 | 9 | 13 | 0.66 | 1 | 5 | 1 | 0.080 | 7 |
| 63K16-48 | 6080084 | 409776 | 658496 | 55 | 30 | 5.14 | 311 | 50 | 16 | 34 | 0.82 | 1 | 5 | 1 | 0.050 | 7 |
| 63K16-49 | 6081330 | 405595 | 658457A | 329 | 65 | 31.73 | 230 | 8 | 29 | 20 | 0.40 | 1 | 5 | 2 | 0.080 | 41 |
| 63K16-50 | 6080493 | 405356 | 658428A | 173 | 31 | 24.39 | 308 | 4 | 12 | 10 | 0.22 | 1 | 5 | 1 | 0.160 | 54 |
| 63K16-51 | 6080383 | 405335 | 658428B | 172 | 45 | 29.21 | 438 | 22 | 23 | 10 | 0.45 | 1 | 5 | 2 | 0.200 | 45 |
| 63K16-52 | 6080664 | 406924 | 658435 | 10 | 22 | 6.85 | 726 | 27 | 6 | 15 | 1.47 | 1 | 5 | 1 | 0.170 | 15 |
| 63K16-53 | 6080205 | 406828 | 658455 | 38 | 19 | 3.81 | 212 | 91 | 2 | 42 | 0.49 | 1 | 5 | 1 | 0.040 | 12 |
| 63K16-55 | 6085293 | 407515 | 658478 | 93 | 22 | 7.11 | 411 | 16 | 6 | 119 | 0.93 | 2 | 5 | 2 | 0.090 | 11 |
| | | | 658482 | 93 | 38 | 11.57 | 731 | 15 | 15 | 70 | 1.18 | 1 | 5 | 2 | 0.100 | 18 |
| | | | 658484 | 11 | 16 | 4.22 | 274 | 65 | 9 | 21 | 1.25 | 1 | 5 | 1 | 0.050 | 9 |
| | | | 658485 | 59 | 24 | 8.87 | 834 | 12 | 9 | 67 | 1.34 | 1 | 5 | 2 | 0.110 | 15 |
| 63K16-56 | 6085928 | 406918 | 658463 | 225 | 44 | 22.71 | 344 | 8 | 19 | 35 | 0.99 | 1 | 5 | 2 | 0.140 | 25 |
| 63K16-57 | 6085846 | 406897 | 658470 | 116 | 31 | 12.08 | 228 | 7 | 6 | 62 | 1.26 | 1 | 5 | 1 | 0.090 | 8 |

| Mineral Occurrence | UTM Coordinates Northing | Easting | Sample Numbers | V (ppm) | Ti (%) | Na (%) | K (%) | Ca (%) | Sr (ppm) | Al (%) | Hg (ppb) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 63K16-01 | 6086569 | 434664 | 841140 | 56 | 0.09 | 0.03 | 0.27 | 1.48 | 18 | 1.16 | |
| | | | 841141 | 116 | 0.07 | 0.38 | 1.12 | 0.81 | 105 | 2.81 | |
| | | | 841142 | 71 | 0.22 | 0.04 | 0.88 | 0.39 | 11 | 1.39 | |
| | | | 852995 | 60 | 0.22 | 0.11 | 0.85 | 0.88 | 53 | 1.98 | |
| | | | 852996 | 77 | 0.17 | 0.09 | 0.55 | 1.07 | 22 | 1.60 | |
| | | | 852997 | 70 | 0.19 | 0.09 | 0.64 | 0.99 | 30 | 1.65 | |
| | | | 852998 | 114 | 0.38 | 0.16 | 1.46 | 0.87 | 62 | 2.70 | |
| | | | 852999 | 82 | 0.25 | 0.09 | 0.87 | 0.49 | 15 | 1.51 | |
| | | | 853000 | 91 | 0.24 | 0.09 | 0.88 | 0.78 | 18 | 1.63 | |
| | | | 853001 | 131 | 0.37 | 0.36 | 1.44 | 0.66 | 64 | 2.88 | |
| | | | 853002 | 71 | 0.27 | 0.07 | 1.00 | 0.20 | 8 | 1.58 | |
| | | | 853003 | 112 | 0.28 | 0.14 | 1.10 | 0.95 | 53 | 2.51 | |
| | | | 853008 | 87 | 0.25 | 0.10 | 0.90 | 0.36 | 23 | 1.68 | |
| | | | 853012 | 97 | 0.28 | 0.08 | 1.10 | 0.17 | 7 | 1.78 | |
| | | | 853013 | 82 | 0.30 | 0.06 | 1.12 | 0.22 | 6 | 1.62 | |
| | | | 853014 | 18 | 0.04 | 0.03 | 0.16 | 0.07 | 5 | 0.33 | |
| 63K16-02 | 6084045 | 434480 | 850233 | 214 | 0.24 | 0.15 | 0.20 | 12.63 | 29 | 0.48 | |
| | | | 850234 | 169 | 0.08 | 0.15 | 0.07 | 6.79 | 15 | 0.75 | |
| | | | 850235 | 203 | 0.07 | 0.44 | 0.25 | 11.66 | 55 | 1.87 | |
| 63K16-03 | 6083919 | 428509 | 841149 | 4 | 0.01 | 0.01 | 0.01 | 0.06 | 1 | 0.03 | |
| | | | 841151 | 127 | 0.16 | 0.31 | 0.80 | 7.29 | 99 | 4.18 | |
| | | | 841156 | 23 | 0.02 | 0.03 | 0.12 | 0.65 | 8 | 0.40 | |
| | | | 841157 | 13 | 0.01 | 0.01 | 0.05 | 0.13 | 1 | 0.10 | |
| | | | 841159 | 18 | 0.01 | 0.02 | 0.08 | 0.31 | 8 | 0.30 | |
| | | | 841160 | 262 | 0.22 | 0.25 | 1.68 | 10.24 | 142 | 5.46 | |
| | | | 841161 | 88 | 0.13 | 0.09 | 0.65 | 18.07 | 65 | 0.94 | |
| | | | 841182 | 4 | 0.01 | 0.01 | 0.01 | 0.05 | 2 | 0.06 | |
| | | | 841183 | 156 | 0.20 | 0.16 | 0.97 | 3.37 | 26 | 1.79 | |
| 63K16-04 | 6082230 | 429013 | 841143 | 182 | 0.09 | 0.24 | 0.95 | 1.70 | 37 | 3.48 | |
| | | | 841144 | 114 | 0.08 | 0.23 | 0.99 | 2.37 | 37 | 3.73 | |
| | | | 841145 | 131 | 0.09 | 0.25 | 1.12 | 1.39 | 33 | 3.90 | |
| | | | 841150 | 103 | 0.01 | 0.06 | 0.33 | 8.29 | 43 | 1.56 | |
| 63K16-05 | 6082352 | 429822 | 841155 | 4 | 0.01 | 0.01 | 0.01 | 1.61 | 7 | 0.04 | |
| | | | 841168 | 5 | 0.01 | 0.01 | 0.01 | 0.33 | 3 | 0.03 | |
| | | | 841169 | 4 | 0.01 | 0.01 | 0.01 | 0.25 | 2 | 0.02 | |
| | | | 841170 | 10 | 0.01 | 0.05 | 0.01 | 10.54 | 32 | 0.04 | |
| 63K16-06 | 6081595 | 429426 | 850225 | 28 | 0.15 | 0.09 | 0.75 | 1.03 | 12 | 0.94 | |
| | | | 850226 | 3 | 0.01 | 0.01 | 0.01 | 0.04 | 1 | 0.04 | |
| | | | 850227 | 4 | 0.01 | 0.02 | 0.01 | 0.11 | 26 | 0.08 | |
| | | | 850228 | 4 | 0.01 | 0.02 | 0.02 | 0.20 | 4 | 0.10 | |
| | | | 850239 | 3 | 0.01 | 0.02 | 0.01 | 0.14 | 13 | 0.06 | |
| 63K16-07 | 6082962 | 430602 | 850242 | 5 | 0.01 | 0.06 | 0.01 | 1.84 | 7 | 0.03 | |
| | | | 850245 | 11 | 0.01 | 0.03 | 0.04 | 0.40 | 4 | 0.08 | |
| 63K16-08 | 6080498 | 430181 | 850244 | 43 | 0.04 | 0.10 | 0.01 | 0.54 | 4 | 0.61 | |
| 63K16-09 | 6082482 | 430659 | 850236 | 74 | 0.15 | 0.16 | 0.77 | 3.05 | 13 | 1.35 | |
| 63K16-10 | 6082572 | 432131 | 850221 | 85 | 0.05 | 0.24 | 0.03 | 2.72 | 18 | 1.34 | |
| | | | 850223 | 4 | 0.01 | 0.03 | 0.01 | 0.04 | 1 | 0.02 | |
| | | | 850224 | 144 | 0.03 | 0.16 | 0.11 | 5.65 | 19 | 0.96 | |
| | | | 850222 | 58 | 0.04 | 0.26 | 0.01 | 2.72 | 24 | 1.47 | |
| 63K16-11 | 6082929 | 431496 | 850230 | 99 | 0.05 | 0.19 | 0.06 | 2.10 | 20 | 1.48 | |
| | | | 850231 | 125 | 0.11 | 0.19 | 0.73 | 2.56 | 24 | 1.42 | |
| 63K16-12 | 6084496 | 434019 | 850241 | 27 | 0.06 | 0.09 | 0.05 | 1.14 | 6 | 0.49 | |
| 63K16-13 | 6084240 | 433649 | | | | | | | | | |
| | SITE | A | 850217 | 3 | 0.01 | 0.01 | 0.01 | 0.03 | 1 | 0.02 | |
| | | | 850218 | 89 | 0.13 | 0.17 | 0.70 | 2.88 | 18 | 1.45 | |
| | | | 850219 | 148 | 0.16 | 0.15 | 0.81 | 4.44 | 22 | 1.90 | |
| | | | 850220 | 195 | 0.17 | 0.15 | 0.94 | 5.96 | 16 | 1.43 | |
| | SITE | B | 850250 | 111 | 0.02 | 0.15 | 0.10 | 10.22 | 160 | 0.20 | |
| | | | 850251 | 142 | 0.08 | 0.17 | 0.52 | 7.77 | 55 | 0.75 | |
| | | | 850252 | 113 | 0.20 | 0.17 | 1.12 | 4.00 | 12 | 1.65 | |
| | | | 850253 | 46 | 0.02 | 0.13 | 0.02 | 3.70 | 12 | 0.47 | |
| | | | 850254 | 163 | 0.07 | 0.17 | 0.44 | 8.22 | 55 | 0.71 | |
| | SITE | C | 850266 | 29 | 0.05 | 0.19 | 0.21 | 6.79 | 33 | 0.84 | |
| | | | 850267 | 2 | 0.01 | 0.01 | 0.01 | 0.06 | 1 | 0.01 | |
| | | | 850268 | 60 | 0.03 | 0.08 | 0.20 | 2.16 | 8 | 0.55 | |
| | | | 850269 | 45 | 0.03 | 0.21 | 0.03 | 2.31 | 23 | 1.07 | |
| | | | 850270 | 10 | 0.01 | 0.02 | 0.05 | 0.16 | 1 | 0.08 | |

| Mineral Occurrence | UTM Coordinates Northing | Easting | Sample Numbers | V (ppm) | Ti (%) | Na (%) | K (%) | Ca (%) | Sr (ppm) | Al (%) | Hg (ppb) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | SITE | D | 850246 | 7 | 0.01 | 0.05 | 0.03 | 0.86 | 6 | 0.15 | |
| | | | 850247 | 20 | 0.02 | 0.05 | 0.08 | 1.02 | 4 | 0.19 | |
| | | | 850248 | 9 | 0.01 | 0.02 | 0.01 | 0.04 | 1 | 0.07 | |
| | | | 850249 | 106 | 0.14 | 0.25 | 1.23 | 9.86 | 50 | 2.77 | |
| | SITE | E | 850255 | 3 | 0.01 | 0.02 | 0.01 | 0.05 | 2 | 0.06 | |
| | | | 850256 | 66 | 0.12 | 0.27 | 0.48 | 4.72 | 39 | 1.64 | |
| | | | 850257 | 97 | 0.23 | 0.12 | 1.22 | 0.35 | 4 | 2.12 | |
| | | | 850259 | 6 | 0.01 | 0.03 | 0.01 | 0.61 | 5 | 0.06 | |
| | | | 850260 | 4 | 0.01 | 0.01 | 0.01 | 0.02 | 1 | 0.03 | |
| | SITE | F | 850258 | 64 | 0.03 | 0.15 | 0.15 | 4.65 | 18 | 0.71 | |
| 63K16-17 | 6079791 | 433563 | 850237 | 125 | 0.05 | 0.23 | 0.31 | 4.33 | 24 | 1.59 | |
| | | | 850238 | 10 | 0.01 | 0.02 | 0.01 | 0.09 | 1 | 0.05 | |
| 63K16-18 | 6079750 | 432891 | 850261 | 32 | 0.04 | 0.50 | 0.15 | 2.64 | 43 | 2.57 | |
| | | | 850262 | 166 | 0.26 | 0.40 | 1.96 | 5.47 | 105 | 4.84 | |
| | | | 850263 | 6 | 0.01 | 0.02 | 0.01 | 0.23 | 2 | 0.06 | |
| | | | 850264 | 208 | 0.20 | 0.32 | 1.72 | 2.41 | 81 | 4.11 | |
| | | | 850265 | 5 | 0.01 | 0.02 | 0.02 | [illegible] | 1 | 0.04 | |
| 63K16-19 | 6068916 | 434652 | 860618 | 20 | 0.08 | 0.01 | 0.24 | [illegible] | 14 | 1.31 | |
| | | | 860619 | 27 | 0.09 | 0.01 | 0.06 | 1.12 | 16 | 0.78 | |
| | | | 860620 | 95 | 0.22 | 0.03 | 1.24 | 0.90 | 14 | 2.42 | |
| 63K16-20 | 6076349 | 434500 | 852989 | 48 | 0.05 | 0.15 | 0.04 | 0.83 | 7 | 0.80 | |
| | | | 852990 | 122 | 0.12 | 0.13 | 0.45 | 0.48 | 3 | 2.72 | |
| | | | 852993 | 145 | 0.04 | 0.11 | 0.09 | 0.37 | 4 | 2.45 | |
| | | | 853025 | 119 | 0.03 | 0.08 | 0.08 | 0.40 | 5 | 1.43 | |
| | | | 853026 | 44 | 0.05 | 0.02 | 0.33 | 0.07 | 2 | 0.79 | |
| | | | 853027 | 44 | 0.12 | 0.06 | 0.80 | 0.08 | 4 | 1.79 | |
| 63K16-21 | 6070652 | 418740 | 860741 | 545 | 0.01 | 0.01 | 0.13 | 0.27 | 5 | 0.82 | |
| | | | 860742 | 68 | 0.10 | 0.06 | 0.11 | 1.29 | 41 | 2.17 | |
| 63K16-22 | 6068858 | 421843 | 853866 | 17 | 0.02 | 0.01 | 0.08 | 0.08 | 2 | 0.24 | |
| 63K16-26 | 6072304 | 433987 | 861101 | 118 | 0.12 | 0.10 | 0.33 | 0.89 | 5 | 1.58 | |
| | | | 861102 | 46 | 0.06 | 0.07 | 0.05 | 0.93 | 5 | 0.98 | |
| | | | 861103 | 46 | 0.05 | 0.08 | 0.02 | 0.52 | 1 | 0.76 | |
| | | | 861104 | 80 | 0.05 | 0.10 | 0.08 | 2.18 | 11 | 1.84 | |
| | | | 861105 | 54 | 0.11 | 0.07 | 0.04 | 0.78 | 10 | 1.73 | |
| | | | 861106 | 58 | 0.09 | 0.08 | 0.04 | 0.70 | 3 | 0.74 | |
| 63K16-27 | 6073502 | 428725 | 861118 | 3 | 0.01 | 0.01 | 0.01 | 0.04 | 1 | 0.01 | |
| | | | 861119 | 3 | 0.01 | 0.01 | 0.02 | 0.10 | 1 | 0.03 | |
| | | | 861120 | 3 | 0.07 | 0.08 | 0.44 | 0.64 | 7 | 0.89 | |
| | | | 861121 | 4 | 0.01 | 0.01 | 0.02 | 0.05 | 1 | 0.09 | |
| | | | 861122 | 116 | 0.25 | 0.15 | 1.49 | 1.38 | 19 | 2.93 | |
| | | | 861123 | 2 | 0.01 | 0.01 | 0.01 | 0.01 | 1 | 0.01 | |
| | | | 861124 | 2 | 0.01 | 0.01 | 0.01 | 0.10 | 1 | 0.01 | |
| | | | 861125 | 3 | 0.08 | 0.05 | 0.43 | 0.72 | 7 | 0.68 | |
| | | | 861501 | 10 | 0.09 | 0.06 | 0.66 | 0.27 | 9 | 1.36 | |
| 63K16-28 | 6074837 | 435335 | 861506 | 13 | 0.01 | 0.01 | 0.01 | 0.02 | 1 | 0.03 | |
| | | | 861507 | 40 | 0.06 | 0.12 | 0.15 | 1.04 | 7 | 1.15 | |
| 63K16-29 | 6081293 | 434893 | 861509 | 102 | 0.01 | 0.07 | 0.02 | 5.95 | 52 | 0.25 | |
| | | | 861510 | 108 | 0.01 | 0.05 | 0.11 | 2.62 | 18 | 0.88 | |
| | | | 861511 | 112 | 0.04 | 0.09 | 0.19 | 3.40 | 14 | 1.32 | |
| | | | 861512 | 68 | 0.15 | 0.11 | 0.25 | 0.75 | 6 | 1.09 | |
| | | | 861513 | 66 | 0.17 | 0.11 | 0.31 | 0.92 | 7 | 1.40 | |
| | | | 861517 | 90 | 0.01 | 0.04 | 0.04 | 1.55 | 11 | 0.71 | |
| 63K16-30 | 6074442 | 430425 | 861519 | 75 | 0.09 | 0.10 | 0.41 | 0.60 | 7 | 1.56 | |
| | | | 861520 | 58 | 0.10 | 0.09 | 0.51 | 0.52 | 7 | 1.63 | |
| | | | 861521 | 27 | 0.03 | 0.09 | 0.02 | 1.70 | 30 | 0.71 | |
| 63K16-31 | 6076883 | 431499 | 861701 | 46 | 0.05 | 0.19 | 0.04 | 1.65 | 14 | 1.16 | |
| | | | 861702 | 141 | 0.20 | 0.19 | 1.30 | 1.36 | 39 | 2.37 | |
| | | | 861703 | 8 | 0.01 | 0.01 | 0.02 | 0.33 | 2 | 0.19 | |
| | | | 861704 | 4 | 0.01 | 0.01 | 0.02 | 0.10 | 1 | 0.05 | |
| | | | 861705 | 4 | 0.01 | 0.01 | 0.02 | 0.10 | 1 | 0.04 | |
| 63K16-34 | 6076214 | 428729 | 861694 | 75 | 0.1 | 0.43 | 0.78 | 4.63 | 165 | 5.94 | |
| | | | 861695 | 72 | 0.1 | 0.43 | 0.71 | 4.96 | 180 | 6.07 | |
| 63K16-35 | 6076369 | 429117 | 861694 | 75 | 0.1 | 0.43 | 0.78 | 4.63 | 165 | 5.94 | |
| | | | 861695 | 72 | 0.1 | 0.43 | 0.71 | 4.96 | 180 | 6.07 | |
| 63K16-36 | 6092016 | 406060 | 658423 | 33 | 0.06 | 0.05 | 0.02 | 0.34 | 7 | 0.29 | 30 |
| | | | 658425 | 5 | 0.01 | 0.01 | 0.01 | 0.01 | 1 | 0.01 | 10 |
| 63K16-37 | 6091918 | 406117 | 658-3 | 32 | 0.04 | 0.04 | 0.02 | 0.40 | 7 | 0.47 | 40 |

| Mineral Occurrence | UTM Coordinates Northing | Easting | Sample Numbers | V (ppm) | Ti (%) | Na (%) | K (%) | Ca (%) | Sr (ppm) | Al (%) | Hg (ppb) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 65845 | 27 | 0.03 | 0.05 | 0.01 | 0.30 | 9 | 0.37 | 10 |
| | | | 65846 | 64 | 0.01 | 0.02 | 0.07 | 0.28 | 5 | 0.53 | 5 |
| | | | 65849 | 6 | 0.01 | 0.01 | 0.01 | 0.01 | 1 | 0.02 | 5 |
| 63K16-38 | 6088327 | 403970 | 658411 | 2 | 0.04 | 0.03 | 0.01 | 0.08 | 2 | 0.14 | 10 |
| | | | 658412 | 2 | 0.03 | 0.02 | 0.02 | 0.10 | 3 | 0.19 | 30 |
| | | | 658414 | 1 | 0.04 | 0.03 | 0.01 | 0.12 | 3 | 0.12 | 50 |
| 63K16-39 | 6088667 | 404236 | 658416E | 80 | 0.11 | 0.10 | 0.37 | 0.72 | 20 | 1.34 | 30 |
| 63K16-40 | 6087862 | 405610 | 658491 | 61 | 0.04 | 0.02 | 0.22 | 0.23 | 2 | 0.78 | 5 |
| 63K16-41 | 6087000 | 406207 | 658420 | 4 | 0.01 | 0.01 | 0.03 | 0.14 | 2 | 0.10 | 10 |
| 63K16-42 | 6086903 | 407074 | 658422 | 13 | 0.03 | 0.02 | 0.02 | 5.37 | 29 | 0.18 | 20 |
| 63K16-43 | 6086846 | 406842 | 658489 | 2 | 0.01 | 0.01 | 0.01 | 0.05 | 2 | 0.05 | 5 |
| 63K16-44 | 6082440 | 407276 | 658447 | 61 | 0.13 | 0.08 | 0.03 | 1.93 | 14 | 0.83 | 5 |
| 63K16-45 | 6082325 | 407221 | 658440 | 28 | 0.03 | 0.04 | 0.04 | 0.55 | 6 | 0.49 | 20 |
| | | | 658441 | 16 | 0.01 | 0.03 | 0.02 | 0.57 | 4 | 0.29 | 10 |
| 63K16-46 | 6078036 | 407538 | 658449 | 48 | 0.02 | 0.03 | 0.23 | 0.10 | 4 | 1.08 | 20 |
| 63K16-47 | 6078079 | 407847 | 658437A | 346 | 0.05 | 0.09 | 0.19 | 3.23 | 51 | 1.20 | 20 |
| | | | 658437B | 41 | 0.11 | 0.04 | 0.55 | 0.50 | 11 | 1.23 | 10 |
| 63K16-48 | 6080084 | 409776 | 658496 | 34 | 0.06 | 0.45 | 0.20 | 1.86 | 66 | 3.11 | 5 |
| 63K16-49 | 6081330 | 405595 | 658457A | 32 | 0.01 | 0.01 | 0.08 | 0.07 | 2 | 0.47 | 80 |
| 63K16-50 | 6080493 | 405356 | 658428A | 15 | 0.02 | 0.02 | 0.02 | 0.49 | 10 | 0.26 | 10 |
| 63K16-51 | 6080383 | 405335 | 658428B | 19 | 0.03 | 0.06 | 0.16 | 0.71 | 9 | 1.07 | 30 |
| 63K16-52 | 6080664 | 406924 | 658435 | 83 | 0.26 | 0.03 | 1.34 | 0.22 | 5 | 2.28 | 5 |
| 63K16-53 | 6080205 | 406828 | 658455 | 28 | 0.07 | 0.04 | 0.15 | 0.31 | 6 | 0.65 | 30 |
| 63K16-55 | 6085293 | 407515 | 658478 | 99 | 0.11 | 0.17 | 0.40 | 1.40 | 56 | 2.40 | 30 |
| | | | 658482 | 172 | 0.10 | 0.07 | 0.65 | 0.41 | 12 | 1.55 | 20 |
| | | | 658484 | 59 | 0.13 | 0.66 | 0.73 | 2.75 | 168 | 5.26 | 10 |
| | | | 658485 | 178 | 0.15 | 0.09 | 0.47 | 0.64 | 26 | 1.73 | 30 |
| 63K16-56 | 6085928 | 406918 | 658463 | 81 | 0.05 | 0.02 | 0.21 | 0.29 | 4 | 1.17 | 20 |
| 63K16-57 | 6085846 | 406897 | 658470 | 137 | 0.21 | 0.05 | 0.90 | 0.13 | 6 | 1.80 | 40 |

MAPS
NOT
FILMED

CARTES
OMISES